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CONTENTS.

PAGE

Notes on an Improved Method of Removing the Cancerous Uterus by the Vagina. By Howard A. Kelly, M. D., - - 55

A Preliminary Report on the Surgical Treatment of Complicated Fibroid Tumors of the Womb, with a Description of Two Methods of Operating. By Howard A. Kelly, M. D., 56

Observations upon the Neural Anatomy of the Inguinal Region Relative to the Performance of Herniotomy Under Local Anæsthesia. By Harvey Cushing, M. D., - - - - - - 58

The Pathological Findings in a Case of General Cutaneous and Sensory Anæsthesia without Psychical Implication. By Henry J. Berkley, M. D., - - - - - - - - - - - - - 64

Congenital Malformations of the Heart as Illustrated by the Specimens in the Pathological Museum of the Johns Hopkins Hospital. By W. G. MacCallum, M. D., - - - - - 69

PAGE

Summaries or Titles of Papers by Members of the Hospital and Medical School Staff appearing Elsewhere than in the Bulletin, - - - - - - - - - - - - - - - - - - 71

Proceedings of Societies:

Hospital Medical Society, - - - - - - - - - - - - - - 72

Exhibition of Patients [Dr. Platt];—Changes in the Cells of the Nucleus Dorsalis resulting from Pressure upon the Upper Portion of the Spinal Cord; Area of Necrosis in Internal Capsule in Typhoid Fever [Dr. Barker];—Poisonous Snakes [Dr. Kelly].

Notes on New Books, - - - - - - - - - - - - - - - - 73

Books Received, - - - - - - - - - - - - - - - - - - 75

NOTES ON AN IMPROVED METHOD OF REMOVING THE CANCEROUS UTERUS BY THE VAGINA.

By Howard A. Kelly, M. D., *Gynecologist-in-Chief, the Johns Hopkins Hospital.*

My ideas upon the subject of the extirpation of the cancerous uterus (cervical cancer) have undergone considerable change within the past year. A careful examination of my material and reports from other clinics have shown that we dare not reason too closely upon a supposed analogy between cancer of the uterus and cancer of the breast; in other words, glandular metastases, which play such an important part in the extension of mammary cancer are relatively unimportant, and as a rule, only observed in the latest stages of uterine cancer.

More careful histological studies show that the uterine cancer extends progressively through the tissues from its cervical focus. The great aim of the operation for the extirpation of cancer, becomes, therefore, that of giving the diseased cervix the widest possible berth, instead of being, as before supposed, the removal of the uterus plus the extirpation of the pelvic glands.

In the first place the frequent recurrence of the disease in the scar tissue of the vaginal vault points to the importance of commencing the enucleation on the vaginal side at a point far below the manifest limits of the invasion, not less than 2-2½ cm. distant or even more.

In order to give the diseased cervix the widest possible berth in the direction outwards into the bases of the broad ligaments, I would again insist upon the necessity of catheterizing the ureters in every case as a preliminary to the radical operation. This can be done by putting the patient in the knee-breast position, and introducing my open vesical speculum, and carrying one of my renal catheters up into one kidney and then catheterizing the other. The patient is then turned on her back and the air allowed to escape from the bladder through a vesical catheter, and the enucleation proceeded with.

If this preliminary catheterization is not done, the operator is forced to adopt one of two courses, both of which are bad; either he must skin out the cervix for fear of including the ureters in his ligatures, or he must consume a long time in a difficult dissection of the ureters not marked out by the bougie. The latter alternative many feeble patients will not stand. I insist, therefore, with the utmost earnestness and emphasis that the surgeon who proposes to give his patient the best possible chance of recovery is under the absolute necessity of learning to catheterize the ureters.

After this most important preliminary and after a thorough

curettage of the diseased area, I cut through the vagina on all sides and proceed to strip it loose from the bladder, so as to expose the vesico-uterine peritoneum, and to open the peritoneum as widely as possible at this point. If the bladder is diseased, the base of it may be cut off and left sticking to the cervix.

The peritoneum is now also opened posteriorly into the recto-uterine pouch so that the uterus remains attached by its broad ligaments alone.

A gauze pack is then put into the pelvis behind the uterus and the cervix is thrust back against it, while the anterior uterine wall is caught with museau forceps step by step and drawn down through the anterior incision until the fundus appears at the vaginal outlet.

The next step now is to bisect the uterus from above downward; this is not attended with any serious bleeding.

The surgeon now proceeds to remove the uterus in the following manner: one half of the body of the uterus is caught by a stout museau forceps, while the other half is allowed to retract within the vagina; then, catching the cervix of the same side with the forceps, the body is completely severed from the cervix by dividing from within outward. As soon as the division is completed, the uterine vessels are clamped in the exposed cellular tissue, and the detached body is now pulled further out and the round ligament clamped, and lastly the uterine cornu. In this way one quadrant of the uterus is removed. The body of the uterus on the opposite side is next removed in like manner.

Ligatures are then applied in place of the clamps. The ovaries and tubes are removed after the body of the uterus. It is, as a rule, much easier to remove the ovaries and tubes in this way when there is more room secured than to take them out with the body of the uterus. The removal of the body of the uterus in this way affords so much room that it now becomes an easy matter to take out the cervix on the side which is least implicated, under all circumstances giving it the widest possible berth, and keeping the rigid catheterized ureter under touch all the time during the enucleation.

The steps of the operation as thus far described, which have been rapidly and easily conducted, may be looked upon as more or less preliminary; three-quarters of the uterus have been removed and the remaining quadrant, that half of the cervix which is on the side where the infiltration of the broad ligament is most marked, now remains to be extirpated also, completing the operation.

In reality so important is this last step that the operation may at this point be looked upon as only having just begun. All the skill of the operator must be concentrated upon this step, upon securing the most thorough, wide extirpation of this remaining piece.

In order to do this as effectively as possible, the extirpation of the three portions indicated has afforded a maximum space, and the operator is not now embarrassed by the presence of the uterine body in the pelvis. He holds in the grasp of his forceps a small nodule, one-half of the cervix, and his desire is to get it out with perfect control of the vessels giving it the widest possible berth. This may be done in some cases by ligature, but will be better done in other cases by cautery clamps such as have been devised by Dr. Skene, of Brooklyn, or by igniextirpation as extensively practised by Mackenrodt of Berlin (see Martin's Festschrift, 1895, p. 100).

If the ureter lies clearly beyond the diseased area and is unaffected, it may be dissected out and left intact; in many of these cases, however, the operator must not hesitate a moment in cutting off the ureter above the diseased area, and proceeding with the wide enucleation of the nodule as if the ureter did not exist. After the enucleation is over, the ureter may then be readily turned into the denuded bladder and stitched there (uretero-cysto-neostomy).

The anterior and posterior peritoneal surfaces are then drawn down and attached to the vagina, and are again sutured together in the middle line, so as to leave but two small openings up into the pelvis which are loosely stuffed with gauze.

While the cases operated upon are still too recent to be offered in evidence, there can be no doubt whatever that this plan of operating, like any other plan which gives the disease a wider berth, must give a better percentage of permanent recoveries.

CASES: F. J., Nov. 7, 1899, Gyn. No. 7351.
S. S., Nov. 14, 1899, " 7370.
E. J., Nov. 14, 1899, " 7371.
S. T., Nov. 18, 1899, " 7384.
E. M., Nov. 29, 1899, " 7405.
K. H., Nov. 30, 1899, " 7411.
M. J., Dec. 21, 1899, " 7428.
M. H., Jan. 10, 1900, " 7495.
I. B., Feb. 24, 1900, " 7582.

A PRELIMINARY REPORT ON THE SURGICAL TREATMENT OF COMPLICATED FIBROID TUMORS OF THE WOMB, WITH A DESCRIPTION OF TWO METHODS OF OPERATING.

BY HOWARD A. KELLY, M. D., *Gynecologist-in-Chief, the Johns Hopkins Hospital.*

It is now four years and a half since I described before the Southern Gynecological Association, at a meeting in Washington, November 12, 1895, a new method of performing a supravaginal myomectomy for fibroid tumors of the uterus.*

This new method of enucleation was by means of a continuous incision through first the ovarian, then the uterine vessels of one side, down under the tumor, cutting across the cervix, and catching the uterine vessels of the opposite side as they are exposed, and up the broad ligament to the round ligament, and last of all the corresponding ovarian vessels. By means of this rapid plan of enucleation the tumor and

*See BULLETIN of the Johns Hopkins Hospital, Feb., 1896.

the part of the uterus involved with it are rolled out and all the vessels controlled within three or four minutes.

Complications on the part of the tubes and ovaries, in the form of adhesions, hydrosalpinx and pelvic abscesses, are also more easily dealt with under this plan of enucleation than under any other. It is always easier to attack an inflamed tube and an ovary from the front of the broad ligament which is opened up in this way, than to attack the same inflamed structure from the posterior part of the pelvis before enucleating the tumor.

The large experience which I have gained since publishing the paper above referred to has only served to confirm my conviction that no other plan of operating can rival this one in simplicity, in rapidity, and in affording complete control of the complications referred to.

While this plan is the best for the vast majority of cases, occasionally a complicated case turns up in which it can only be applied with difficulty. I have in mind several cases which have recently passed through my hands where neither the common method of performing hysteromyomectomy, that of tying down on both sides to and including the uterine vessels, and then amputating the cervix, nor my own method of the continuous transverse incision epitomized above was applicable without great difficulty and considerable risk to the patient.

The first case in which I found it necessary to make a radical departure in the method of enucleation belonged to the group of cervical myomata. In this instance there was no cervix to be felt by the vagina, and on opening the abdomen the bladder was found raised half way up the umbilicus by an ovoid tumor choking the pelvis, with its long axis vertical. The body of the uterus containing a few small nodules sat high up in the abdomen above the umbilicus like a cap on top of this tumor and on the right and on the left sides the displaced uterine and ovarian vessels were spread out in a network. I began the enucleation by trying to tie off these vessels wherever I could catch them on the left side. There was a great deal of hemorrhage from the surface of the tumor, and as soon as I commenced to detach the ligated vessels and to push them down the hemorrhage increased. It was evident that the patient, who was already feeble and anæmic, could not survive the operation if there was to be any additional considerable loss of blood. I then at once resorted to the following plan which promptly overcame the difficulty and speedily terminated the operation without further loss of blood:

I took two long-jawed pedicle forceps and controlled all the vessels on each side of the uterus on top of the tumor by thrusting one of the open jaws of the forceps through the capsule of the tumor on one side at about the level of the round ligament from the front of the broad ligament until the point appeared on the posterior surface of the tumor behind the broad ligament; I then clamped the forceps powerfully down on the uterine and ovarian vessels, entirely controlling the circulation. Both sides were treated in this way.

I then took a long-bladed knife, and grasping each uterine cornu with stout short-toothed museau forceps and pulling in opposite directions, I bisected the uterus and cut on down into the tumor as far as the vesical peritoneum, which was freed and pushed down, when the tumor was completely bisected.

The next steps were the enucleation of the left and the right halves of the tumor. Grasping the left half of the tumor at a convenient point and pulling it away from its bed with a pair of museau forceps it was rapidly enucleated from its uterine bed by means of a blunt crenated spatula, which I always use in the enucleation of myomata. The right half was then enucleated in the same way. All these steps were carried out without a particle of hemorrhage, in remarkable contrast to the beginning of the operation.

With the enucleation of the large cervical tumor the tissues surrounding it collapsed, and the uterine artery was easily reached and tied at a selected point below the body of the uterus, and all the difficulties of the situation vanished and the case became a simple one. The two halves of the uterus were enucleated separately and the bed of the tumor closed by buried sutures and the vesical peritoneum drawn over and attached to the posterior peritoneum concealing the wound and the operation finished.

The enucleation of the bisected uterine body may be done after the removal of the tumor in one of two ways—either by tying the ovarian vessels, now easily reached, and the round ligaments and lastly the uterine vessels and then amputating, or by severing first one then the other half of the uterus from the cervix below, cutting from within outwards, from the centre of the cervix towards the broad ligament, and so exposing and catching the uterine vessels, after which they are divided and each half is pulled up in turn by its cervical extremity and the round ligaments of the ovarian vessels tied in order. The direction of the enucleation in this case is from below up, the reverse of the direction ordinarily taken; the extirpation in this way is facilitated by the sagittal bisection of the uterus.

The patient made an excellent, uninterrupted recovery, and has returned to her home and duties in the country.

I would urge this plan of dealing with fibroid tumors of large size occupying the lower uterine segment, and elevating the uterine as well as the ovarian vessels, and choking the pelvis; in these cases the vessels cannot be tied in mass, but require numerous separate ligatures, and the operator is constantly embarrassed by hemorrhage if the ordinary plan is pursued.

The other case in which still a different plan of operating was found necessary was that of a fibroid tumor filling the pelvis and reaching as high as the umbilicus. The patient, when put on the table, had a rapid small pulse which speedily ran up to 140.

I opened the abdomen, and after releasing some omental adhesions, found the large tumor firmly fixed in front of the vertebral column behind the umbilicus by extensive dense adhesions. The colon was so intimately attached to it that it soon became evident as I tried to detach it that a continued dissection would necessitate an extensive resection of the bowel. I then resorted to a plan successfully adopted in a previous case, January 24, 1891 (See Gyn. Reports, No. 2, p.

582), that of leaving a thin layer of the tumor upon the bowel, that is, of sacrificing the tumor for the sake of the bowel. As soon, however, as I cut into the tumor it began to bleed freely, and I did not dare to go ahead on account of the condition of the patient.

I then turned to the lower pelvic pole of the tumor, hoping to be able to free it by tying off the vessels from above downwards and amputating the cervix; I found it attached to the whole anterior surface of the uterus above the cervix, pushing the fundus of the uterus down to the pelvic floor out of reach. I was able to place two clamps on the tops of the broad ligaments controlling the ovarian vessels, but this was not a necessary step in the following procedure then adopted, which met the complications in a satisfactory manner.

The cervix which could be felt at the vesical reflection was caught by stout short-toothed museau forceps and pulled up within reach; the vesical peritoneum was detached and pulled down, exposing more of the cervix, which was caught with a second pair of forceps.

A knife was then plunged through the cervix in an anteroposterior direction between the two pairs of forceps, and the cervix was cautiously divided from side to side (that is to say coronally or transversely) by pulling the divided cervix apart. The cellular tissue to the left of the cervix was first exposed, and the uterine vessels, not yet seen, clamped with a short, stout forceps; the uterine vessels on the right side were next controlled in the same way.

When these important vascular trunks were thus secured, the upper forceps was forcibly used to drag up the tumor and uterine body, rotating them on a transverse axis, exposing first the round ligaments and then the ovarian vessels of the left and the right sides, respectively; these structures were clamped and the whole mass disconnected from its pelvic attachments. The tumor now only remained adherent by the dense adhesions at its upper pole. The next step was the rupture of an enormous abscess lying behind it and extending from the centre of the tumor into a sac bordered posteriorly by the lumbar vertebræ and above by the mesocolon and discharging through a large opening into the transverse colon. The tumor now rolled out, being enucleated from behind forward without added injury of the bowel, other than was rendered necessary by the opening into its lumen. The contaminated abdominal cavity and the abscess cavity, containing at least a litre of thick yellow pus, were cleansed, the opening in the bowel sutured and the long abdominal wound closed, leaving a large iodoform gauze drain about the umbilicus into the remainder of the sac under the colon.

The patient has made an excellent recovery with a small rapidly closing fistulous tract.

This type of operation is, I think, the very best that can be adopted for those cases in which there are dense adhesions to the upper pole of the tumor which cannot be dealt with without great risk by attacking them in a direction from before backwards.

I have tried the first plan of operating by bisecting the fibroid uterus in eight cases in all; it has so happened that several complicated cases of tumor developed in the cervical region have recently come into my hands. In the other cases I simply made the enucleation in this fashion in order to demonstrate its feasibility. The continuous transverse incision must always remain the operation of elective choice.

The second plan of operation has been followed in but one case (K. H.).

Cases: A. W., December 10, 1899, No. 7438.
C. W., December 21, 1899, No. 7460.
T. B., January 1, 1900, No. 7474.
A. S., January 3, 1900. (Sanatorium.)
M. B., January 27, 1900, No. 7537.
D. C., February 4, 1900, No. 7552.
E. H., February 24, 1900, No. 7583.
M. K., February 26, 1900, No. 7597.
K. H., February 1, 1900, No. 7549. (Myoma with abscess opening into colon.)

OBSERVATIONS UPON THE NEURAL ANATOMY OF THE INGUINAL REGION RELATIVE TO THE PERFORMANCE OF HERNIOTOMY UNDER LOCAL ANÆSTHESIA.*

By Harvey Cushing, M. D., *Associate in Surgery, the Johns Hopkins University.*

Introduction.

During the past two years in a considerable percentage of the large number of herniotomies performed in Dr. Halsted's clinic recourse has been made to methods of local anæsthesia. In thirty of these cases definite contraindications to the employment of general narcosis have been present, and from this number two definite groups may be recognized:

(I) Those cases in which immediate operative intervention is demanded, as in strangulation, and in which ether is contraindicated from the shock and vomiting associated with ileus;

And (II) the cases in individuals advanced in years who desire to become rid of an annoying hernia, and who a few years ago were uniformly refused operation, since associated cardiovascular lesions, chronic bronchitis and emphysema with other senile changes made them submit to the administration of general anæsthesia with notorious uncertainty.

When there exists no apparent contraindication to the administration of ether or chloroform, however, it may safely be said that the anæsthesia of the operator's choice will continue to be a general and not a local one. Nevertheless, during the past few months observations upon the nervous anatomy of the inguinal region to be reviewed in this paper, have so greatly assisted us in the development of a painless operation that this statement may be qualified to a considerable degree. Since August of 1899 thirty-two herniotomies with cocaine or eucaine β have been performed upon young

* Extracted from *The Annals of Surgery*, Vol. XXXI, 1900, p. 1.

men who might without risk have taken a general anæsthetic, and in many instances absolutely without the infliction of pain other than that incidental to the first insertion of the needle. During the fall this procedure became so popularized in the ward where our hernia cases were admitted that the operation under the local anæsthetic became the method of the patient's choice. An individual awaiting operation needed to remain in the ward only long enough to compare the convalescence of an ether case with that of one done under cocaine to choose the latter for himself. Such patients usually regard the shaving and skin preparation as the most trying part of their operative ordeal, and most of the original observations on cutaneous anæsthesia were made on these cases during the operation and immediately after closing the wound. It has been found also that the patient can assist not a little in certain steps of the operation, as, for example, when the neck of the sac is closed, in making negative abdominal pressure to prevent the omentum, or bowel, from being pushed down between the peritoneal sutures.

Observations from Cocaine Operations upon the Neural Anatomy of the Hernial Region.

The application of an anatomical familiarity with the peripheral distribution of the spinal nerves, which since the introduction of ether and chloroform has fallen into abeyance, has become once more of interest and importance to the surgeon in extensive operations under local anæsthesia. Furthermore, no condition has ever afforded similar opportunities for the accurate investigation of the sensory distribution of these nerves, since methods of dissection are necessarily gross, and physiological experiments upon animals naturally present variations from the human type.

The principles of cocainization of main trunks of nerves, introduced as early as 1885, have since been utilized in operations on the extremities for minor and even major amputations,* for the anæsthetization of areas on the thigh preliminary to the removal of Thiersch grafts and like procedures, but I am unaware that heretofore similar methods have been made use of in operations on the trunk. To insure success in any major operation attempted under local anæsthesia, an accurate knowledge of the course and situation of the nerves likely to be encountered is most essential, since the accidental division of an unexpected sensory nerve-trunk is often sufficient to overcome whatever preliminary inhibition to pain the patient may have had, and thus to make recourse to complete narcosis necessary in cases where it should, perhaps, be specially avoided. In our earlier hernia operations pain was not infrequently inflicted where now none is occasioned, owing to greater familiarity with the course and distribution of the nerves concerned.

*Absolutely painless amputations of the lower extremity for senile gangrene in individuals to whom it seemed unwise to administer ether have on two recent occasions been performed at this hospital after preliminary exposure and cocainization of the sciatic nerve in the thigh (under cocaine). This procedure is free from the objections which seem to attend Bier's method (*Deutsche Zeitschrift für Chirurgie*, 1899) of cocainization of the spinal cord.

In the accompanying sketch (Fig. 1) an attempt has been made to show diagrammatically the usual cutaneous distribution of the inguino-scrotal nerves as well as the deeper situation of the main trunks. Through the kindness of Dr. Bardeen I have been able to compare with my results a great number of sketches made in the anatomical department for an unpublished report on the peripheral nervous system, and though there is considerable variation in the situation and anastomoses of the particular nerves of this region, as may be seen by consulting Griffin's article (*Journal of Anatomy and Physiology*, 1891), we have taken what may represent the average.

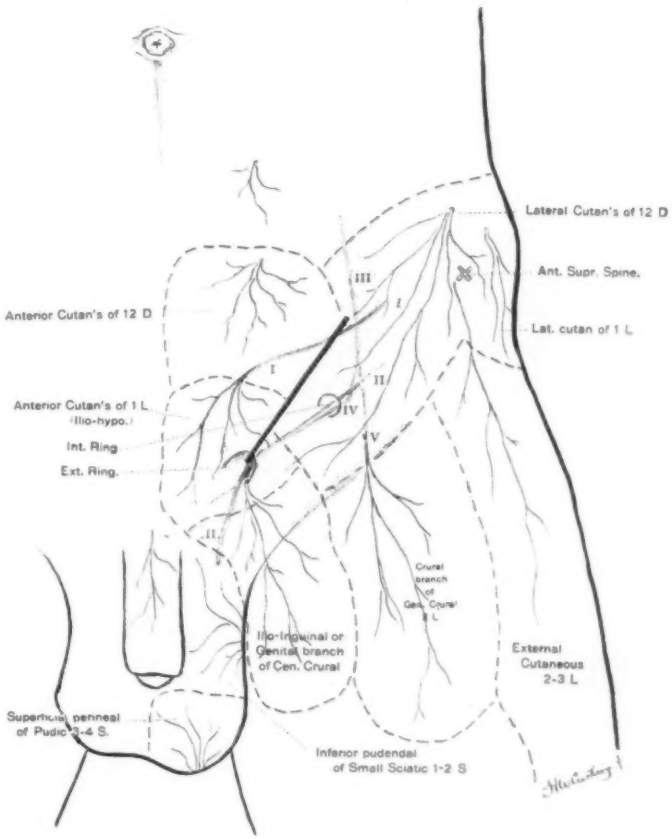


FIG. 1.—Showing inguino-scrotal nerves, their peripheral distribution and relation of the main trunks to the hernia incision. I. Iliohypogastric; II. Ilio-inguinal; III. Genito-crural; IV. Genital branch; V. Crural branch.

Superficial Nerves encountered by the Incision.—The skin incision, as ordinarily made, passes in a line which separates the ventral and lateral cutaneous branches of the twelfth dorsal and first lumbar nerves. The lower angle of the incision, however, quite uniformly overlaps the anterior branches of the first lumbar (ilio-hypogastric) nerve, as they sweep downward and outward from their point of emergence through the aponeurosis, about five centimetres above the external ring. The upper angle of the incision, depending

somewhat on its distance from the median line, and also upon the variable and complementary length of filaments of the

FIG. 2.—Areas of anæsthesia after double cocaine herniotomy. Anæsthesia lies to the inner side of left incision, which was made nearer Poupart's ligament and has divided lateral cutaneous branches of twelfth dorsal. It lies to the outer side of the right incision made farther from Poupart's and dividing fibres from the anterior division of twelfth dorsal. This was one of our earlier cases in which no attempt was made to preserve the nerves, and the anæsthesia is permanent.

ventral and lateral branches of the twelfth thoracic, may divide fibres from one or the other of these sources, and thus lead to a subsequent area of anæsthesia to the inner or outer side of this upper angle of the incision. This is well illustrated by the accompanying photograph (Fig. 2) of a double

FIG. 3.—Showing small post-operative area of anæsthesia to the inner side of the incision, consequent to the division of lateral cutaneous branches of the twelfth dorsal. In this case the ilio-inguinal and genital branch of the genito-crural had been divided with loss of cremasteric reflex, but without producing any cutaneous anæsthesia.

herniotomy, in which the incisions were made at different distances from the median line. This bordering anæsthesia, on one side or other of the skin incision, may occasionally represent the entire area of post-operative cutaneous anæsthesia, even when the ilio-inguinal and the genital branch of the genito-crural have been divided or cocainized, as is shown in photograph (Fig. 3). Presumably in such instances the crural branch of the genito-crural supplies the area on the inner side of the thigh (cf. Fig. 4) usually innervated by the former two nerves. Such an arrangement occurs not infrequently in Dr. Bardeen's diagrams. On several occasions there has been no resulting post-operative area of cutaneous anæsthesia whatever.

Deeper Nerves met in the Operation.—The ilio-inguinal nerve emerges from the external ring, and near by, or also through the ring, the genital branch of the genito-crural appears. In the canal they frequently are found anastomosed as one trunk, the early cocainization of which at the deeper part of the canal, after splitting the aponeurosis beyond the internal ring, is perhaps the most important step of the operation. As has been stated above, this may result in no additional *cutaneous* anæsthesia. The usual anæsthetic sequel, however, is represented by a complete loss of sensation of the entire scrotal contents, cord, hernial sac, and testicle, with the possible exception of its lower vascular supply (superficial perineal),

FIG. 4.—Area of anæsthesia of ilio-hypogastric, ilio-inguinal, and genital branch of genito-crural in a unilateral cocaine case, following operation. This began to fade by the twenty-first day, with return of cremasteric reflex. This represents the most complete type of anæsthesia in unilateral cases, and is the same even after division of the cord and castration, and consequent section of all possible cutaneous filaments of the genital branch of the genito-crural and the ilio-inguinal.

and by a cutaneous area of anæsthesia which occupies the inner side of Scarpa's triangle, spreading over the adductor tendons. Division of the nerve is unassociated with any surface anæsthesia of the scrotum whatever (cf. Fig. 4). It is ordinarily stated, to the contrary, that these nerves are a source of cutaneous supply to the scrotum; for instance, Professor Thane says (Quain's "Anatomy," Vol. iii, Pt. II, p. 341, 1895), "The root of the penis, on its dorsal aspect, and a part of the scrotum anteriorly are supplied by the ilio-inguinal and genito-crural nerves." It was of extreme interest, consequently, to find that the ilio-inguinal, supplying most of the *contents* of the scrotum, was not represented by any *cutaneous* distribution to the same. The inferior pudendal branch of the

small sciatic and superficial perineal of the internal pudic, therefore, supply in most cases, at all events, its entire cutaneous surface. It is possible that, on the principle of Sherrington's observation concerning the overlapping of sensory areas, we might account for the failure of anæsthesia after division of the single nerve to appear over the whole territory innervated by it, but as will be seen by comparing segmental spinal lesions such an explanation will not hold, and probably the whole scrotal cutaneous supply is from the sacral and not the lumbar plexus. A case of fracture-dislocation of the spine at

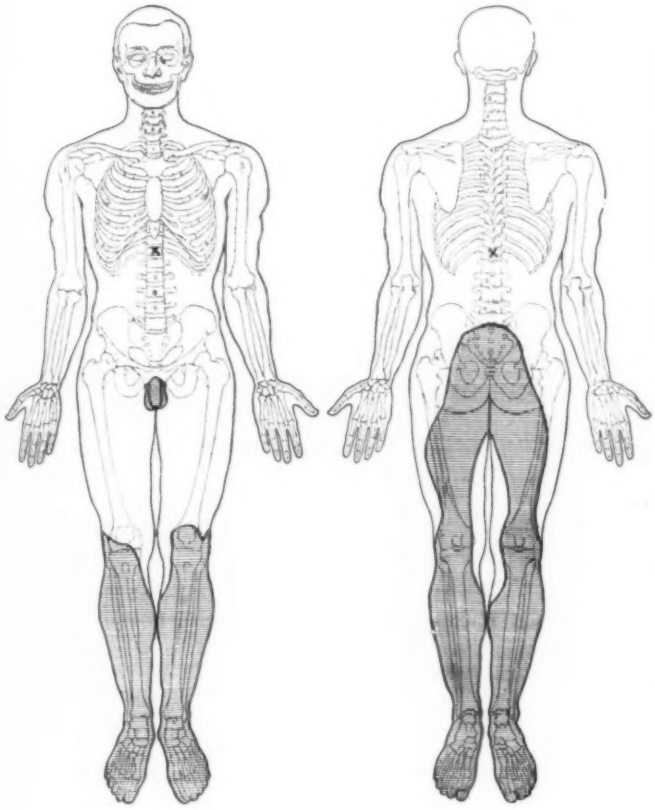


FIG. 5.—Areas of cutaneous anæsthesia result from a compression fracture of the twelfth dorsal vertebra, producing a total transverse lesion at the fifth lumbar segment. Scrotal and penile anæsthesia are complete, though the lesion lies below the first lumbar (ilio-inguinal) segmental level.

the twelfth dorsal vertebra, with transverse lesion of the cord, entered the hospital at the time these observations were being made, and offered confirmatory evidence of what has just been stated. The anæsthetic areas resulting from this injury, and which are shown in the accompanying diagrams plotted by Dr. Yates (Fig. 5), offered an interesting negative of the anæsthesia following the hernia cases. Though the entire penis and scrotum in this case were devoid of sensation, the transverse lesion of the cord was situated at the fifth lumbar segment,—that is, between the level of origin of the ilio-inguinal (first lumbar) and that of the small sciatic and internal pudic (second and third sacral) nerves. If the ilio-inguinal normally overlapped the latter nerves, the root of the penis and upper part of the scrotum would naturally have retained sensation. A similar condition is shown in one of Kocher's diagrams of a case of fracture-dislocation at this level. (*Die Läsionen des Rückenmarks* u. s. v., S. 627). In another of his cases (*Ibid., S.* 631), in which the segmental lesion is at the 3–4 sacral level, the upper portion of the scrotum has retained sensation as the inferior pudendal (1–2 sacral) has escaped injury.

Furthermore, in this spinal case, as would be expected, the cremasteric reflex was retained, whereas we have observed that after division or cocainization of the ilio-inguinal and genito-crural nerves, this reflex is, temporarily, at all events, lost on the side of division.* On the other hand, the vermicular movements of the dartos, supplied together with the skin by the sacral nerves, are preserved after divisions of the ilio-inguinal, but were lost in the spinal case together with the cutaneous anæsthesia.

The ilio-hypogastric, as will be seen in the diagram (Fig. 1), may be twice encountered in the operation; its superficial filaments by the skin incision, as has been described, and its deeper trunk, as it lies upon the muscle-fibres of the internal oblique at a varying distance from the lower edge of the muscle (Fig. 6). Cocainization of the edge of this muscle, consequently, before its division as in the Halsted operation, is very necessary, especially since, in addition to this main trunk, which may usually be easily recognized after exposure of the internal oblique, there are, contrary to Griffin's observations, off shoots to the muscle itself from this nerve, given off dorsad to the portion exposed by the incision. There are fibres from the genito-crural (Thane) as well, which are similarly distributed to this lower border of the internal oblique. The area of cutaneous anæsthesia, which follows anæsthetization or division of this main stem of the ilio-hypogastric at its point of exposure, surrounds the lower angle of the incision, and extends from a level about seven centimetres above the root of the penis to within one or two centimetres of that organ. No anæsthetic area has ever been found corresponding to Macalister's described branches reaching up towards the umbilicus. In unilateral cases this ilio-hypogastric anæsthesia does not extend to the median line, owing to the overlapping of fibres from the opposite side, so that in bilateral cases alone, such as are illustrated by Fig. 2, can its limits be definitely made out.

THE ANÆSTHETIC, AND APPLICATION OF ANATOMICAL OBSERVATIONS TO THE OPERATION.

It is not within the scope of this paper to discuss the relative merits of various local anæsthetics; suffice it to say that we have found the combination advocated by Schleich ("Schmertzlose Operationen," 1899) to be as efficacious as any with which we have experimented. His solution No. 2, containing the following ingredients:

* It is important, therefore, to guard against division of these nerves in varicocele operations in which it is desirable to preserve cremasteric tone.

Cocainæ mur.,.....0.1
Morphinæ mur.,.....0.02
Sodii chlor.,..... 0.2
Aqua destillata, ad 100.00

has best served our purpose, and has been without the objections usually accredited to cocaine solutions,—viz., toxicity and dissolution when sterilized. Solutions in strength of 1 to 20,000, Schleich claims to be efficient for infiltration, and capable of producing anæsthesia which is free from the prodromal hyperæsthesia, the "anæsthesia dolorosa," which accompanies aqueous and saline infiltrations. Amounts of the 1 to 1000 solution, however, greatly in excess of what is needed for the longest operation, have failed to give toxic symptoms, and, contrary to the experience of many, we have found that one or two sterilizations fail to diminish its efficiency. Experience with eucaine β, which Braun (*Archiv für klinische Chirurgie*, 1898) and Hentze (*Archiv für pathologische Anatomie und Physiologie*, 1898) have so strongly advocated, has failed to demonstrate in our hands that it possesses any superiority over the 0.1 per cent cocaine solution of Schleich. In fact, we have been impressed by the fleeting nature of the anæsthesia and by its tardy appearance.

On several occasions long skin incisions have been made through a linear area of anæsthesia, produced half with sterilized Schleich's solution and half with the eucaine β combination, which Braun advocates. If the operation is prolonged over an hour, pain is occasioned on placing the subcuticular suture of closure in the eucaine area, while none appears in that which had been infiltrated with cocaine. The fact that its toxicity is five times greater than that of eucaine does not argue in its disfavor, provided one uses solutions weak enough to avoid toxic effects. For anæsthetization of the individual nerve-trunks I have used a $\frac{1}{2}$ to 1 per cent sterilized solution usually of cocaine which is injected directly into the nerve sheath.

Steps of the Operation.—Individuals—and it is especially important for those advanced in years—are usually kept in bed for a day or two preliminary to the operation, to give an indication of their ability to endure recumbency and for the purpose of training them to void their urine in this position. Evacuation of the bladder is usually accomplished by the aid of an enema if any postural difficulty is experienced, and it is a matter of satisfaction that but one of the cases reported in which these precautions were taken required post-operative catheterization, an old man, sixty-eight years of age, who had symptoms of prostatic hypertrophy.

It has been the custom to administer hypodermically a tenth or an eighth of a grain of morphine, three-quarters of an hour before, and to repeat this shortly before the operation. Ceci has emphasized the efficiency of this morphia-cocaine combination, and I have found it most satisfactory. The drug must be used with caution, however, since occasionally even small doses of morphine in old people may confine the bowels and lead to distention, which may be troublesome, as one of our cases illustrated. Similarly, in old people with tardy bladders, it may inhibit the proper evacuation of the urine, though we have never had the misfortune to observe this.

Patients past middle age also are usually shaved and cleaned on the operating-table, to avoid any exposure incidental to an open-ward preparation. The skin in the line of proposed incision is infiltrated with Schleich's cocaine solution, and the incision may be immediately made through the linear wheal thus produced. It is common experience to find the infiltrated tissues more vascular than usual, and it is important that all bleeding points be immediately clamped, since a dry and unstained field is essential to the success of the dissection.*

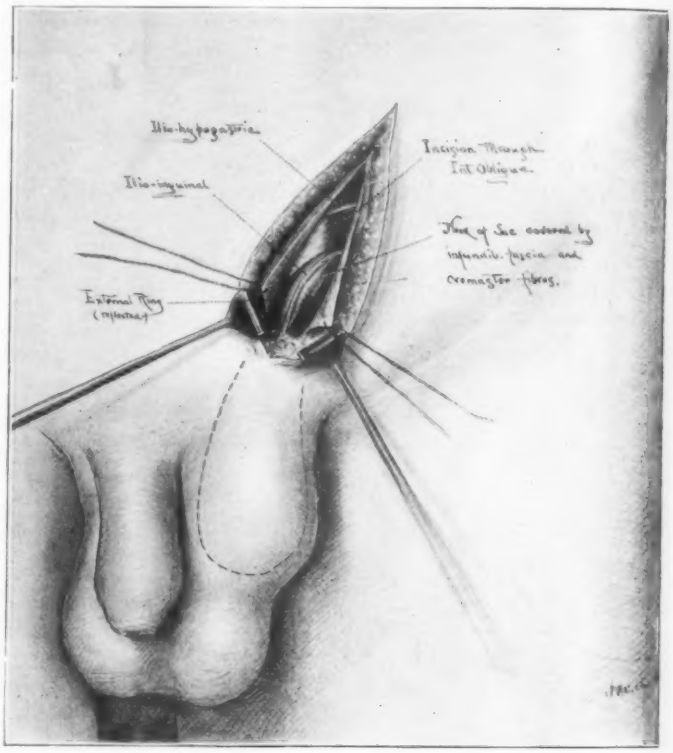


FIG. 6.—Sketch showing usual situation of nerves as exposed after reflection of the divided aponeurosis.

It is unnecessary and useless to attempt to anæsthetize the panniculus. As Schleich has shown, only tissues which can be "œdematized" are fitted for the infiltration method, and in the panniculus, at the upper angle of incision practically no nerves are encountered. If, however, throughout its whole length, this incision is carried down to the aponeurosis, unanæsthetized fibres of the ilio-hypogastric will be encountered in the superficial fat at the lower angle, together with one or two large veins, division of which is painful, so that anæsthetization of the panniculus layer would here be necessary. A much better method is to carry the incision only at

*A good index of one's skill and familiarity with the hernia operation can be drawn from the condition of the tissues at the time of closure, for they should be as free from blood-staining as when first incised. This, of course, is the most important factor in obtaining perfect healing, and for the accomplishment of this a good assistant is indispensable. A perfect hernia operation is not a "one-man" operation.

the upper angle down to the aponeurosis, which is then opened in line of fibres from the external ring, and the ilio-hypogastric and inguinal nerves immediately cocainized with a 1 per cent solution as they are thus exposed. After this procedure the lower angle of the incision may be painlessly carried down to the external ring, and the remaining intercolumnar fibres of the aponeurotic insertion divided. Reflection of the pillars of the ring then gives the view shown in the accompanying sketch (Fig. 6). In the Halsted operation at this stage the internal oblique fibres are divided, preliminary cocainization of the edge of muscle being necessary for the reasons given above. There is, under ordinary circumstances, no further need of the anæsthetic, as we are working in an area freed from all sensation. The combined ilio-inguinal and genital branch, which has been cocainized at the outer limit of exposure, is now reflected usually to the outer side, care being taken not to divide it, since this leads apparently to a more or less permanent paralysis of the cremaster, which is to be avoided. I believe the accidental division of this nerve leads to the great relaxation of the scrotum so often seen after hernia and varicocele operations. In the latter operation, especially, it would be detrimental to the best interests of a successful result to interfere with the cremasteric function in any way. I think it not impossible also that the division of these nerves and interference with the sympathetic plexus about the cord may be responsible for the occasional atrophy of the testicle which has followed the great denudation of the vas deferens in some operations. The remainder of the operation, the exposure of the sac and cord after a longitudinal division of the infundibuliform fascia, the amputation of the sac at its neck, and closure of the peritoneal opening, the excision of the fundus of the sac, division of the cord and castration—if deemed advisable in senile cases—may now be done practically without pain. Occasionally, however, some stray fibres of the genito-crural may be encountered about the neck of the sac, and also during castration I have found that ligation of the veins at the lower pole of the testicle may be painful, though division of the cord above is not. Possibly the superficial perineal branches which have been unanæsthetized furnish nerves to this lower blood-supply.

The closure of the parietes by any of the more commonly employed methods may now be painlessly accomplished. Not infrequently in these cases, in old people with large hernias of long standing, the two rings have become concentric, and the falciform expansion of the conjoined tendon is no longer present. It is in such cases that Bloodgood has advocated transplantation of the rectus fibres after opening of the sheath and exposure of this muscle, so that a muscle-lined wound may be formed throughout the whole length of the inguinal canal. No additional cocainization is necessary for this step, since innervation of this portion of the rectus comes by the nerves already cocainized. Tightening the deep sutures in closing the wound may elicit a dull sensation of pain, which the patient usually describes as an uncomfortable sensation of "pressure" and it is occasionally possible that the upper one of the deep sutures must be placed above the field which is completely anæsthetized and thus be painful. For this reason it should be left to the last. The subcuticular silver suture, used in closing the skin, does not pass beyond the limits of the original area of cutaneous infiltration, and consequently it may be placed without pain. Interrupted "through and through" cutaneous sutures, of course, must be avoided, as they would emerge outside of the limits of original cutaneous infiltration.

It occasionally happens during the operation, whether from slight ability on the patient's part to endure discomfort or from the accidental division of some sensory fibres, that what inhibition towards pain he may have at first possessed becomes exhausted, and recourse must be had to a general anæsthetic. Under these circumstances we have found that a few inhalations of chloroform—not enough, however, to make the patient lose consciousness—are sufficient to tide him over the most difficult parts of the operation. It is remarkable, under such circumstances, how small an amount of the general anæsthetic is requisite to benumb sensation. We may justly speak, therefore, of the method of anæsthesia which is employed as a *morphia-cocaine-chloroform* combination, the first and last drugs being merely adjuvants of the local anæsthetic, which in most cases suffices alone.

An assistant in these cases, who takes the place of the anæsthetist, occupies by no means an unimportant position. The usual record of pulse and respiration is kept, and by occupying his attention and by timely encouragement the patient may be tided over the more trying periods of his operative ordeal; duties which otherwise devolving upon the operator may be distracting. Lilienthal (*Annals of Surgery*, 1898, p. 58) speaks of this position as that of a "moral anæsthetist."

Patients have never complained of post-cocainization pain in the region of the incision, and healing seems to have been absolutely unaffected by the local infiltration. In none of these cases has there been other than primary union. It is very unusual for the large, starched, or plaster dressings, immobilizing thigh and pelvis, to be cut down before the tenth or twelfth day, when the suture is removed.

Advantages of the Local Anæsthetic.—There is an avoidance of unpleasant or dangerous post-etherization sequelæ. There is no vomiting or retching to put strain upon the recent sutures. Urinary disturbances are much less apt to occur, and catheterization is rarely necessary. The diet may practically be continued as before the operation. There is no backache, since there is no narcosis to induce relaxation of spinal muscles, and thus put strain upon the ligaments. The dressings may be applied originally to suit the comfort of the patient—which is of especial importance in old people—and there is no subsequent disarrangement of them. Above all is the advantage gained in being able to operate with comparative safety in patients who would incur immediate risk in submitting to general anæsthesia.

Disadvantages.—These seem trivial in comparison. More time is consumed in the operation, and there is necessarily some distraction to the surgeon. In two exceptional instances there has been some post-operative nausea for a few hours—possibly from an idiosyncrasy toward cocaine. The operation is doubtless more difficult and some pain is inflicted. The degree of this depends entirely, however, upon the surgeon's familiarity

with the use of local anæsthetics in abdominal work, as well as with the steps of the hernia operation and also upon his knowledge of the anatomical distribution of the sensory nerves of the region concerned. On many occasions no actual pain whatever need be experienced, and should there be some, it is small in comparison with the discomforts of an ether convalescence; and the greater difficulties which confront the surgeon at the operating-table are more than compensated for by his subsequent freedom from the anxiety which, in this particular class of cases, attends the administration of, and convalescence from, general anæsthesia.

THE PATHOLOGICAL FINDINGS IN A CASE OF GENERAL CUTANEOUS AND SENSORY ANÆSTHESIA WITHOUT PSYCHICAL IMPLICATION.

ABSTRACT PAPER.

By Henry J. Berkley, M. D., *Clinical Professor of Psychiatry.*

The detailed clinical history of this case can be found in *Brain*, Vol. XIV, Part IV, 1891. A careful search of the medical literature has disclosed no similar instance occurring either before or since the date of its publication.

A synopsis of the clinical record as then published shows: (1) A strong hereditary tendency to nervous instability; the mother, two maternal uncles, two brothers and two sisters having been insane. The father had died of tuberculosis. (2) A syphilitic infection acquired from her husband at the age of twenty-nine years, subsequent to which the patient had several abortions, sore throat and falling out of the hair.

For twenty-two years after the subsidence of acute symptoms due to the syphilitic process there was fair health. Then came an attack of acute arthritis, after which the patient never fully recovered her former physical condition. Within a few months thereafter, her eyesight began to grow dim, there were sudden flashes of light before the eyes, and vision was gradually extinguished, only sufficient remaining to enable her to distinguish light from darkness.

In the early summer of 1889, nearly six years after the rheumatic attack, the patient began to experience a general tingling and formication in the skin of the entire body, which was shortly followed by several spells of uncontrollable vomiting.

A consensus of the numerous examinations made during the years 1889 and 1890 showed a total loss of thermic, pain, olfactory, gustatory, equilibrium, pressure and weight sensations; almost total of the visual sense; and a partial loss of tactile and muscular impressions, muscular sense and auditory perceptions. None of the special senses, or cutaneous sensations remained wholly uninvolved.

Besides these disturbances of the sensory apparatus several other symptoms of almost equal prominence were recorded.

The musculature while responding to the will did so in such a feeble manner that the patient was incapacitated from helping herself to any extent. Thus the dynamometer when taken in the hand and squeezed was so feebly compressed that the indicator showed no movement on the dial, though the woman exerted every effort in the trial. Despite this fact, however, both nerves and muscles responded promptly to the galvanic and faradic currents, nor was there anything abnormal noticeable about the quality or time of the reaction.

The cutaneous reflexes were all abolished. The faucial and pharyngeal reflex movements were absent, and a sound could be passed over the epiglottis into the larynx without eliciting a sensation of discomfort or inducing cough. During the attacks of emesis there was no sensation of nausea.

When first examined the knee jerks were present and normal. The biceps jerk could also be elicited with some little trouble. The reaction of the abdominal muscles was lost, and the ankle beat was feeble. By the middle of July, 1890, the right knee reflex had disappeared, and the left one was weak. All other reflexes, deep and cutaneous, had been completely abolished. A year later the jerk of the left patella tendon was found to be extinguished.

Furthermore, with auditory perceptions a progressive dulling could be noted. When the woman was first admitted to the hospital, the sense of hearing was fairly acute in both ears. Gradually the difficulty in receiving auditory impressions increased, until finally the voice could not be heard except with strenuous effort.

The ophthalmoscopic examination showed an extensive choroiditis pigmentosa with atrophy of the optic nerves. Only a few vessels could be seen in the retina, and these were of minute size. In both lenses there was a beginning cataract.

Whether the optic nerve atrophy should be considered part of the general disease-process, beginning as it did long before the other symptoms, is somewhat problematical, though in tabes the same trouble is not infrequently noted as a forerunner of definite symptoms of the disease.

The pupils were at first in a state of mid-dilatation, and responded slowly to light, direct or reflected. They did not dilate on irritation of the cervical sympathetic. At a later stage the pupils became somewhat narrower, but remained sluggish to stimuli.

There were a number of interesting disturbances of the glandular secretions. During the fall of 1889 the mouth was found to be almost absolutely dry, the tongue heavily cracked, the epithelium eroded from its tip and sides, while the entire buccal surface was red and congested. At the same time the secretions of the lachrymal glands had almost ceased, the surfaces of the conjunctivae being dry and injected. The skin was also dry and devoid of odor. After a course of potassium iodide these phenomena slowly abated, and the secretions returned to a more normal state.

Various unusual sensations troubled the patient at times. Cramps of the gastrocnemii, sensations of burning between the scapulæ, a girdle feeling around the abdomen and neuralgic twinges in the nerves of the extremities were often complained of. Occasionally there were clonic fibrillary spasms of the small muscles of the thumbs.

Attacks of diarrhœa, refractory to treatment with drugs, though yielding to a continued milk diet, occurred in the latter part of the winter of 1890. These were on several occasions followed by a protracted vomiting without pain or nausea.

Trophic symptoms in the form of a bulbous appearance of the finger tips and ridging of the nails, together with purpuric spots, developed late in 1891.

Throughout the long course of the illness there was never the slightest departure from normal mentality on the part of the patient; no hysterical attacks, no pathological depression or exaltation, and no delusions or hallucinations were ever noted. A slight apathy was the only perceptible change in the mental phenomena, but this was not greater than is frequently noticed in those who have become blind and helpless.

In discussing the etiology of the sensory phenomena in the previous article, three possibilities were suggested: (1) that the malady was functional, an opinion largely influenced by the pathological findings in the three autopsies on cases of general cutaneous and sensory anæsthesia, reported by Von Ziemssen, Krukenberg and Schüppel respectively. This view was held to be hardly consistent with the presence of an optic neuritis, loss of the reflexes and the trophic manifestations; (2) that the case was an obscure instance of syringomyelia; or (3) that the terminal end-apparatus of the peripheral nerve fibres was diseased.

Though many points are not cleared up by the autopsy, and subsequent microscopic examination of the tissues, the results obtained are sufficient to show that none of these explanations would hold good, the nearest approach to a correct diagnosis being found in the last conjecture—disturbance of the peripheral nervous system.

The patient's condition did not materially alter after the record of the case was published. The anæsthetic and other symptoms, from the reports of the House Physicians to the Hospital, remained about stationary, and on the rare occasions on which I saw her, there were no additional phenomena to be noted other than a steady though slow decline of the vital powers. Late in the year 1893, another ophthalmoscopic examination was made by Dr. H. Friedenwald, who found in the left eye an extensive and typical retinitis pigmentosa, the papilla being blurred and of a dirty yellow color. Few vessels could be seen. In the right eye the clouding of the lens was so profound that the retina could not be seen.

About the middle of May, 1898, Mrs. R. became slightly lethargic, a condition that slowly increased to coma, in which state she died on the 25th of the month.

The autopsy, performed ten hours after death, was distinctly negative, all portions of the central and peripheral nervous systems showing an apparently natural condition. The larger vessels of the thorax, abdominal and cranial cavities, showed scattered atheromatous plaques, but were not considerably thickened. The right middle cerebellar and both posterior communicating arteries of the circle of Willis were congenitally rudimentary. There was some gelatinous thickening of the pia over the central regions of the hemispheres. The optic nerves showed but faint signs of a diseased condition, although the left nerve was a little smaller than the right one. Both kidneys were atrophic, weighing 100 grams each, the loss being principally in the cortex.

After proper hardening for the various Nissl, Weigert, Marchi, and other stains, sections of the entire nervous system were made and studied. The results obtained were to a degree remarkable, and for the sake of convenience may be separated into three categories. (1) Lesions appertaining to the blood vessels, (2) those of the proper nerve elements, and (3) those belonging to the membranes surrounding the encephalon and cord.

There being some difference in the intensity of the vascular lesions in the several portions of the nervous system, it is perhaps better to describe the appearances in the several sections in detail. Those of the arteries of the cord being the best defined will be first studied.

The arteries and veins contained in the pia mater are all immensely thickened, but the morbid process varies considerably in its histological characters in different vessels. In the largest arteries, for example, in the arteria spinalis anterior, the intima is approximately normal, while the middle lamina is greatly hypertrophied. In this latter layer the nuclei are too numerous, though few of them correspond in morphological characters to the nuclei of smooth muscle cells. The adventitia shows no alteration either in respect to its nuclei, or to the connective-tissue fibres.

In a few arteries running longitudinally in the cord's envelope the endothelium and fenestrata have separated from the muscularis—probably a post-mortem change—while the latter layer has assumed a coarsely fibrous aspect, and holds but few nuclei of any kind. The fibres making up the former muscular layer are arranged in a convoluted fashion, resembling to some extent the infoldings of a fenestrata, and on a superficial examination the whole layer might be taken for a multiplied membrana elastica. That such is not the case is readily determined by the fact that a perfect lamina is often found internal to the fibrous middle layer.

In a few of the medium-sized arteries, the lumen is completely closed, solely from an overgrowth of the middle layer. The fibrous tissue composing this media shows no evidence of a hyaline degeneration.

The contents of the lumen of such vessels as are not obliterated are interesting. With eosin-hematoxylin or the Van Gieson stain, the whole canal is seen to be filled with a material containing no blood cells, and homogeneous except for a faint granulation. In preparations by other stains, this homogeneous substance is found to contain a few epithelioid cells with round nuclei. Naturally, vessels that are entirely obliterated, or have their lumen filled by a partly organized mass, were in the minority, the greater number having sufficient blood-carrying capacity to perform a portion of their vital functions.

The smaller arteries also present considerable variation in their structural conditions. A majority have walls thickened in the same manner as is present in the larger ones, while with others there is a minor though distinct degree of hyaline degeneration of the middle coat—it now assuming a yellow-brown tint with picric-acid fuchsin. When this hyaline condition is present, the nuclei are sparse and deformed. In a few arteries the elastica is reduplicated, or even quadruplicated, while at the same time the lumen is so narrowed as to be obliterated here and there, or the small opening internal to the intima is filled with a mass of epithelioid cells, in which stainable nuclei are uncommon.

The walls of the larger veins are almost as thick as those of the arteries, but the lumen is dilated rather than narrowed, and often with an irregular outline.

The root fibres of the entire cerebrospinal axis contain numbers of thickened vessels, some patulous, some obliterated. Many of these vessels show a considerable degree of hyaline alteration of the muscularis. Nowhere, however, do the nerve bundles present any considerable augmentation of the connective-tissue elements.

At one point surrounding an artery coursing longitudinally in the meninges, just outside of the external margin of the left Burdach column, lies a nodule of disintegrated round cells, which bears much resemblance to a gummatous neoplasm, which after growing a certain extent had degenerated. The size of this new formation was very small.

The walls of the vessels within the substance of the cord were also greatly thickened, some of those in the anterior horns being visible to the naked eye. Others in the medullated regions are almost equally large. Everywhere there is hypertrophy of the vascular walls, principally of the middle layer and at times it is difficult to distinguish between vein and artery.

The vessels appear to be unduly numerous everywhere; there is no actual new formation of vessels, but the smallest arterioles, even the capillaries, are so thickened as to be unusually prominent in the microscopic field.

This condition of affairs is more especially true for the gray horns than for the medullary tracts. The horns seem to be everywhere strewn with vessels of all sizes, from those noticeable by the unaided eye to enlarged capillaries. The region containing the greatest number of diseased vessels lies lateral, on both sides, to the gray commissure and in Clark's columns.

There was considerable variation in the intensity of the vascular disease in the several regions of the cord and bulb. In the lumbar and cervical levels, while the morbid process was distinct, it had not the same severity as in certain regions of the medulla, and especially in the lower levels of the dorsal cord, where the lesions seemed to have reached their acme of intensity.

The diseased arteries and veins within the nervous tissues have now only one type of alteration. The intima is but slightly affected, a little thickening of the subendothelial tissue being now and then visible, but it is upon the media that the greatest stress of the pathological condition has fallen. This layer is greatly thickened, and presents either a hyaline or fibrous appearance, according to the intensity and duration of the process, the hyaline degeneration apparently preceding the fibrous change. In some of the vessels the peculiarly shaped nuclei of the muscular structures are to be seen at infrequent intervals, distorted and shrunken to such an extent as to be hardly recognizable. In others no nuclei at all are to be found, and the lamina though fibrous is homogeneous in character. With the Van Gieson stain, the media of a number of vessels takes on a red coloring, but this is diffuse over all the layers, and not confined to the middle one. In still others, the stain acts differently; the intima and adventitia are tinged red, while the muscularis takes only the yellow of the picric acid, and appears not striated but homogeneous.

Externally to the muscularis, lymph spaces are often noted corresponding to local dilatations of the intravascular space. These sometimes contain a few leucocytes. In the adventitia around the altered vessels there is little or no morbid change. It is not unduly thick or fibrous in character, and contains a moderate number of round and oval nuclei. In eosin-hæmatoxylin preparations a greater degree of intimal involvement is noticeable. There is distinct though slight hypertrophy of the layer, with multiplication to a limited degree of the endothelial cells. The lumina are nowhere closed, though there may be great thickening of the media. The regular ring-like appearance of the lumen is rarely disturbed.

Vascular lesions in the cortex and ganglia of the brain are not nearly so profound as in the cord, though here and there a vessel considerably thickened may be noted, the alteration affecting principally the middle layer.

In the meninges of the encephalon fairly numerous thickened arteries are to be seen. They are not equally distributed everywhere, but occur locally. The points of selection in the basal regions for the most altered vessels are in the nerve roots, and especially in the arteries lying between the nerve bundles. In nearly all of the cranial nerves several of these pathological vessels are to be seen, though it is only rarely that a degenerated nerve fibre is to be discovered near them, with the exception of the optic nerve tracts where all the fibres have atrophied.

The arteries of the *integument* showed precisely the same lesions as those of the cord and meninges. In some the morbid process is more extensive than in others, and pronounced hyaline changes in the media are noticeable. The muscular nuclei have for the most part disappeared. The endothelial and subendothelial structures are slightly hypertrophied.

Lesions of the nerve elements varied in direct concordance with the severity of the vascular disease, reaching their acme in the lower portion of the dorsal cord and in the medulla. There was a subsidence of the acuity of the process in the upper region of the cord and in the cortex cerebri. All the changes of a pathological nature were strictly of an atrophic order, and of these the fatty pigmentary degeneration of the cells was the most prominent. Of secondary importance was a condition of simple atrophy of the entire nerve body with shrinkage of the protoplasm and nucleus. The lesions of the conducting fibres were also entirely of a degenerative type.

Throughout the cord, but especially in the dorsal region,

many of the cells in the gray horns were completely filled with coarse yellow pigment grains, among which a shrunken nucleus is now and then discernible. No nucleolus is visible in the atrophied vesicles. In rather infrequent instances the nucleus is pushed to the periphery of the cell. The cells of the columns of Clark seem to have suffered more severely than elsewhere.

In those cells in which the accumulation of pigment is not so considerable, the Nissl bodies are coarse, do not retain their regular arrangement in the protoplasm, but are irregularly distributed throughout the substance. At times these granula also show a tendency to group themselves together at the periphery of the cell-body, leaving a clear ring of considerable extent around the neighborhood of the nucleus. In still other nerve bodies there are scattered clumps of granula in the protoplasm, with large spaces in between devoid of any stainable substance. Lying among these better preserved cells are others that are shrunken to a mass of fine granular material in which neither nucleus nor nucleolus is visible.

The state of the nucleus varies considerably in the least damaged cells. In a majority the caryoplasm and chromatin particles are natural, but there are also a variable number in each section in which the vesicle has the appearance of being swollen, and the nuclear substance is unstainable. In a very few instances there is a double nucleolus marking the presence of an irritative process.

In the upper cervical enlargement and medulla the state of the cells was almost precisely similar to that at the lower levels, though a larger proportion shows a normal arrangement by the Nissl methylene blue. In a considerable number the protoplasm is filled with masses of yellow pigment, which sometimes covers and obscures the nucleus. The irregular disposition of the Nissl bodies in some nerve elements is shown with great distinctness, but in others the granula are diffused throughout the cytoplasm, and their ordinary appearance is lost. Quite a number of the nuclei exhibit a shrinkage of their volume and irregularity of contour. The vesicle also has a tendency to retire to the periphery of the protoplasm.

In the medulla, there were cells among the scattered nuclei on the floor of the ventricle that showed displacement and distortion of the cell-nuclei, but pathological cells on the whole are not common, and few of the nuclei of origin of the cranial nerves contain any considerable numbers of them.

In the higher regions of the medulla oblongata the cell-nuclei are much more frequently displaced than lower down, and the bodies of the cells show greater atrophy. In the region lateral to the V-shaped point of the ventricle there are numerous heavily pigmented cells. The entire cytoplasm is now filled with it, and the nucleus is no longer visible. Some of the nerve elements are in process of disintegration, and double nucleoli are by no means infrequent within the nuclear ring. The morbid process is most marked in the nuclei of origin of the X, XI and XII cranial pairs. Corresponding with the degree of cellular degeneration there is here an advanced degree of arterial disease.

In the anterior portion of the medulla the superior olivary bodies show a pathological state, in that their cells contain heavy masses of pigment equally diffused through the bodies. Elsewhere the accumulation of metaplastic material can hardly be said to be greater than is ordinarily found in persons of somewhat advanced age. The Nissl bodies are fairly well stained in such cells as are not considerably pigmented. The cells of the glossopharyngeal nucleus have less pigment in them than any other nerve elements of this region.

At the level of the pons the cells of the nucleus acusticus dorsalis are filled with metaplastic granules; all others are freer from the accumulation of grains than in the medulla. The nuclei in the cells of the acusticus are displaced, and the outlines of the vesicles are indistinct.

Few changes can be determined among the nerve bodies of the cerebellum, and the vascular lesions are correspondingly slight.

In the cortex the quantity of the pigment granules in the pyramidal cells was not above the normal, and is not diffuse but confined to one corner of the cell. The nuclei and nucleoli are perfect. The cells of the corpora striata and lenticular bodies were a little more pigmented than those of the cortex owing to the more extensive vascular implication.

Taking into consideration the severity of the vascular lesions and the degree of pigmentary atrophy of the protoplasm of the nerve bodies consequent thereto, there is singularly little degeneration of the medullated portion of the neurone, and when it does occur, it is only where the vascular disease has reached its maximum of intensity. But two of the cranial nerves showed any varicosity or atrophy of the nerve fibres. The gray degeneration of the optic nerves had apparently long antedated the other lesions, being far more advanced. Few medullated tubes in the tracts showed any blue-black coloring with the Weigert stain, and all were atrophied; yet there was a very trivial thickening of the interstitial connective tissue between the bundles of fibres, and no multiplication of the fixed nuclei. The degeneration of the fibres among the bundles of the hypoglossal nerve was limited to a single strand, and was probably a direct consequence of the occlusion of an artery that ran longitudinally through it.

The examination of the root fibres of the superior portions of the spinal cord was negative. In the dorsal region a greater number than usual of small medullated tubes were discovered, and some of these were blackened by the Marchi stain, but altogether the number was inconsiderable. No varicose fibres were to be seen anywhere.

Within the substance of the cord, two sclerotic tracts, both of small size and among the ascending fasciculi were found. The lumbar cord was free from any trace of medullary degeneration, and it was not until the level of the ninth dorsal vertebra was reached that any disease of the white columns became manifest. At this level, a small area of degenerated fibres first becomes visible, situated in the right column of Burdach in close proximity to that of Goll. The area occupied is very small. It was at first entirely separated from the pia, but soon approached it more closely, and finally touched the margin. The form of the degenerated tract was irregularly pyramidal, the base broad, lying upon the external margin, the apex, sharply defined, penetrating more deeply. Nearly all of the nerve tubes within this area are atrophied,

with here and there an enlarged axis cylinder among them. This degenerated zone disappeared entirely before the cervical enlargement was reached.

A few millimetres above the beginning of the first degenerated tract (at the level of the lowermost border of the seventh dorsal vertebra), a new area of degeneration was noticed, this time in the left postero-lateral column. At first it appears under a magnification of 80 diameters, as a circular patch not larger than the head of a pin, lying close to the Lissauer zone though not within the indirect pyramidal tract, and well separated from the external border of the cord. Very shortly it enlarges, and assumes a wedge-shaped form, having its broad base on the external border of the cord, and its apex turned towards the deeper regions. It now lies well within the direct cerebellar fasciculus.

In the lower cervical region, the sclerotic area broadens, and at the same time moves from the posterior part of the column to a position almost in the middle of the lateral region, now occupying a place along the posterior edge of the Gower's tract. The irregular wedge-shape is retained throughout this region, the borders of the degenerated being sharply defined from the normal tissue.

In the uppermost region of the cervical cord, the sclerotic zone again moves slightly forward (ventrally) until it comes almost directly into the Gower' tract, then at the level of the lower portion of the pyramidal decussation it decreases perceptibly in size, and at length becomes reduced to a narrow band along the anterior border of the cord, completely within the Gower's bundle.

The sclerotic tract now rapidly decreases in size until it is finally lost at the level of the uppermost portion of the decussation, no degenerated fibres being found in the direct cerebellar tract or extending in the direction of the nucleus lateralis. The cells of this nucleus are numerous, not atrophied in the least, and do not differ in any way from those in the adjacent nuclei of origin of the nerve roots. Sections carried through the medulla and pons failed to show any further degenerated tracts. From the lowermost dorsal to the level of the lower cervical enlargement, the fibres contained in the posterior commissure were much less numerous than usual.

Except in the sclerotic fasciculi, an examination of the neuroglia cells failed to show any participation on their part in the morbid process. While in places about the root fibres of the nerves or origin, the pia was to some extent thickened, this alteration was never considerable, and what thickening there was of the membrane was dependent upon an hypertrophy of the fibre elements and not upon multiplication of round cells.

To recapitulate:—The fundamental pathological basis for the various nervous phenomena described in the clinical history of the case is as follows: (1) A hyaline-fibrous degeneration of the arterial system existed, which was not confined to the central nervous regions, but was equally evident in the roots of the spinal nerves and in the skin tissues. The degree of alteration varied from slight thickening of the muscular layer to complete closure of the lumen from hypertrophy of the middle coat of the vessel walls. The morbid change was accordingly not uniform, but reached its maximum of intensity in the vessels of the lower dorsal cord, the meninges of the bulb and cord, and also in certain of the root bundles of the cerebro-spinal nerves. (2) As a consequence of the vascular lesions there were degenerations of an atrophic order in the nerve cells of the gray horns of the cord, more particularly in those of Clark's column, and in the medulla oblongata. To this alteration in the central nervous substance at least a portion of the various symptoms must be attributed.

Besides the principal lesions there were others of considerable, though minor importance.

The degeneration of scattered fibres in the bundles of the spinal and bulbar nerves played some part in the general symptomatology, being shown during life by the lowering of tone as regards the innervation of the muscles, as well as by disturbances of the functions of the nerves extending from the terminal apparatus.

The sclerosis of a portion of the outer zone of Burdach's column would signify that fibres ascending through the posterior root zones were degenerated, though the small area involved shows that their numbers were inconsiderable. The lesion of the tract itself has but little significance, the fibres involved belonging to short inter-connecting bands.

The lesion of the direct cerebellar tract is not only of more importance, but presents some rather peculiar features. The absence of the majority of the medullated fibres from the posterior commissure, over considerable regions of the medulla spinalis, favors the view that a portion of the cerebellar bundle is formed from the fibres of this commissure. The gradual change of position in the sclerotic area shows also that the fibres—at least in this instance—do not proceed directly upward in the column, but are gradually diverted as other fibres enter, and assume a more and more anterior position; and, furthermore, that a portion of the fibres are lost in the upper cervical and lower regions of the medulla and do not proceed to higher levels. This ending of the ascending fibres has been ascertained for a part of Gower's bundle, but is not usual in the case of the component medullated fibres of the direct cerebellar tract. At its beginning, the degenerated area almost touched the left posterior root zone, while in the upper cervical region it verged upon, if it did not enter, the area assigned to Gower's bundle. The total disappearance of the degenerated area at the lowermost level of the medulla may be considered to have sufficient anatomical value upon which to base the theory that in the so-called direct cerebellar tract other fibre bundles, which are at present unknown, enter into its formation, and that these correspond more closely, in their manner of termination, to the bundles of the Gower's system than to those of the cerebellar paths. The deportment of the sclerotic fasciculus may also give rise to the supposition that we have to do more here with an undescribed bundle, running from the dorsal to the uppermost cervical region.

As an explanation of the numerous symptoms of the case, it would appear most reasonable to suppose the existence of a disease-process affecting simultaneously both the peripheral and central nervous systems. Assuming that the arterial lesions were of late specific origin—and of this there can be

but little reasonable doubt—a chronic progressive involvement of the nutrient channels, here and there leading to marked narrowing or even to closure of isolated vessels, might certainly have produced just such a train of symptoms as was present. Of primary importance would be the involvement of the arteries of the anterior and posterior nerve roots of the bulbo-spinal system, though the direct lesions of the nutrient supply to the terminal nerve apparatus—which have to be inferred as they could not be definitely determined—would be of equal value. This inference of the implication of the end-apparatus is justifiable, since the arterial degeneration in the skin was quite extensive, and whenever there is starvation of a nerve tissue there result pathological reactions which may be manifest in a multitude of ways.

The slowly progressive character of the symptoms is also consistent with the theory of tissue-starvation. All the lesions of the nerve cells of the cord and bulb are of this type—atrophy and pigmentary degeneration from malnutrition. Whenever nutrition is at a low ebb, metaplastic granules accumulate in the protoplasm of the cell.

The condition of the optic tracts—in which the lesions are identical with those of other nerve roots except that they are more advanced—would argue that the thickening of the blood-vessels was of long standing, and that only when the process had advanced to an extreme degree did any definite symptoms show themselves. This is exemplified more particularly in the state of the cortex cerebri. Though in this region vascular disease was manifest and diffuse, it had not advanced nearly to such an extent as in the gray matter of the dorsal cord or in the adjacent meninges. As a consequence, the functions of the cortex, while not as perfect as in youth, were not reduced to the same low level as those of the cord and bulb.

One pathological fact should be remembered in considering the clinical symptoms, namely, that it is not necessary for a vascular lesion to proceed to such a profound degree as to cause the entire shutting off of the nutrient supply before a nerve tissue will show signs of deviation from its normal functions. With a reduced supply of nutrient plasma, definite manifestations of nervous exhaustion are brought about, and these are not due to a degeneration of the component portions of the neurone which is visible in the tissue after death, by our present methods of preparation, in the form of morbid alterations of the cytoplasm, axone or myelin. Long before this stage is reached the entire neurone is incapable of performing its natural functions in an efficient manner, and as a consequence, anæsthesias, paræsthesias, diminution or exaltation of the reflexes, and dulling of the special senses can be noted. Almost precisely similar results are encountered in advanced stages of progressive paralysis, especially in the syphilitic cases in which, when vascular lesions of the arteries of the cerebrum and cord have advanced to a profound degree, there is a gradual but progressive dulling of cutaneous sensibilities and special sensations.

CONGENITAL MALFORMATIONS OF THE HEART AS ILLUSTRATED BY THE SPECIMENS IN THE PATHOLOGICAL MUSEUM OF THE JOHNS HOPKINS HOSPITAL.

BY W. G. MACCALLUM, M. D., *Assistant in Pathology.*

The literature on the congenital malformations of the heart is very extensive, but is well represented by the works of Rokitansky,* Peacock,† Rauchfuss ‡ and Vierordt.§ That of Rokitansky, dealing with the defects of the septa, is, perhaps, the foundation of our accurate knowledge of these anomalies, while Rauchfuss, Peacock and others have added greatly to the observations of anomalies of the heart in general, and have done much to determine their relations to one another. Vierordt, writing in the light of the more recent embryological work of His and Born, presents the whole subject in the most concise and lucid way.

The following is intended to be a brief synopsis of the various malformations to serve as the legend to the photographic illustrations which are taken from the specimens in the pathological museum, and also in a way as a catalogue of those specimens:

A.—*Open foramen ovale.* This is perhaps to be considered a malformation only when the defect is large, as it is so extremely common to find a small interauricular opening well guarded by the valvula foraminis ovalis. Even when widely open in persons who have reached adult life, the symptoms it produces are indefinite or none. It may occur pure or in association with a variety of other defects. The symptoms are more definite when it is associated with mitral insufficiency, for there is then pulsation of the veins of the neck. The so-called paradoxical embolism is the result of the passage of the embolus through the open foramen into the systemic arteries, by which means the sifting-out action of the pulmonary circulation is avoided.

FIG. 1 shows a glass rod passed through the foramen ovale. The fossa ovalis in this case is deep and the valvula foraminis ovalis bulged into the left auricle. It was, however, able to completely close the opening.

B.—*Defects in the septum ventriculorum.* Rokitansky considered the pars membranacea as derived from the ventricular wall, while more recent writers trace its origin to the aortic septum; defects in the septum are most commonly in this small area, the "undefended space" of English writers. They may, however, be at other points in the septum, seldom near the apex. The defect seldom occurs pure, but is oftenest associated with narrowing of the pulmonary orifice. Cyanosis

* Rokitansky: Die Defecte der Scheidewände des Herzens. Wien, 1875.

† Peacock: On malformations of the human heart, with original cases. London, 1858.

‡ Rauchfuss: Die angeborenen Entwicklungsfehler des Herzens. Gerhardt's Handb. d. Kinderkrankh. Tübingen, 1878. Bd. IV, 1 abth.

§ Vierordt: Die Angeborenen Herzkrankheiten. Wien, 1898.

appears when the pulmonary is narrowed (Roger's disease), and there is generally a single, loud, constant murmur in the upper median præcordial region, beginning in systole and covering both sounds. The absence of a murmur in diastole is explained by the covering of the defect by the tricuspid and mitral valves.

Aneurismal dilatation of the membranous portion of the septum may occur, the saccular projection appearing in the right ventricle underneath the tricuspid leaflet to which it is often attached. This sacculation may be actually perforated, but neither of the two specimens in this collection shows this perforation.

The origin of this condition is variously explained as being due to arteriosclerosis, differences in intracardiac pressure, and traction by the adherent tricuspid leaflet.

FIG. 2. The pars membranacea septi is pierced by a round hole about 1 cm. in diameter. The pulmonary orifice in this case was narrowed by a thickening and contraction of the valves.

FIG. 3. The pars membranacea septi is in this case bulged into the right ventricle, forming a saccular projection beneath the tricuspid valve. The mouth of this sac is seen just below the aortic valves.

C.—*Stenosis of pulmonary.* This is the commonest of the malformations of the heart. It is explained as due either to abnormal division of the truncus arteriosus or to congenital inflammatory disease. The narrowing may occur in or above the valves, by the constriction of a fibrous ring in the artery or lastly by a constriction in the conus.

It is often associated with defects in the septa. The right ventricle is hypertrophied unless the pulmonary is completely atresic and the septum ventriculorum closed.

Clinically there is cyanosis with various sounds on auscultation, none of which are typical. Often there is a loud systolic murmur in the 2nd and 3rd left interspaces. The 2nd pulmonary sound may be weak, but is strong if the ductus arteriosus is widely open.

The so-called "Rechtslage" is a condition in which extreme narrowing of the pulmonary orifice is associated with a wide defect in the septum ventriculorum and a shifting of the aortic orifice so that it opens directly over the septum and thus communicates with both ventricles.

FIGS. 4 and 5. "Rechtslage." A, stenosed pulmonary orifice; B, aorta opening into each ventricle; C, mitral, and D, tricuspid orifice. In Fig. 5 a rod is passed through the left ventricle from its apex into the aortic orifice. The figure shows the aortic orifice as seen through the right ventricle.

As regards the general idea that tuberculosis of the lungs is especially frequent in cases of pulmonary stenosis, it is found by a consideration of the statistics that while tuberculosis is frequent in these cases it is not relatively more so than in the other conditions (of heart and general) that produce a predisposing depression of the nutrition of the pulmonary tissues.

D.—*Anomalies in the division of the truncus arteriosus.*

1. Persistence of truncus due to a failure of division.

2. Stenosis or atresia of the pulmonary from the defective course of the dividing septum.

3. Transposition of the arterial ostia.

Rokitansky's classical work on the transposition of the arterial trunks has lent a great theoretical interest to this group; but as the collection contains no representative, no illustration is given. With transposition of vessels we may have the vessels opening from their proper ventricles or from the opposite ventricles, this depending on the behavior of the septum membranaceum, which by a change in its relations may correct the anomaly. There is generally extreme cyanosis, but this may be prevented by a widening of the bronchial arteries.

E.—*Anomalies in the semilunar valves.* Anomalies in the semilunar valves occur more often at the pulmonary orifice than at the aortic. At either orifice there may be but two segments, or on the other hand there may be four or five. They have been explained as due to an excess of the endothelial cushions which go to form the valves.

F.—*Anomalies in the aorta.* The ductus arteriosus may persist as an open communication between the arterial trunks with hypertrophy of the heart. No cyanosis and sometimes a systolic murmur in the 2nd left interspace.

Stenosis or obliteration of the aorta near the entrance of the ductus arteriosus is not uncommon. The stenosis assumes various forms and relations to the position of the ductus—the point of predilection is in the isthmus aortæ. The pulmonary is dilated and the arch of the aorta and the arteries sprin[illegible]g from above the structure greatly widened. Collateral circulation to the lower portions of the body is effected by anastomoses between the internal mammaries and intercostals. The pathogenesis of the condition is rather obscure. The process is by some thought to be an extension of the obliterative changes going on in the ductus.

There is seldom cyanosis; sometimes œdema; the superficial arteries become tortuous and pulsate visibly, there is inequality in radial and femoral pulse and often a systolic murmur varying in its location.

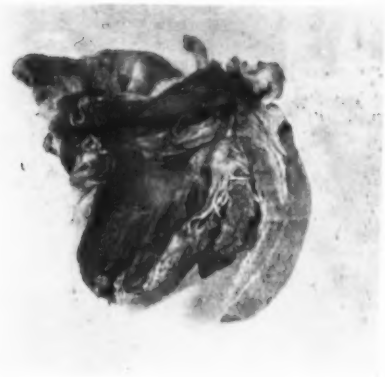
FIG. 6. Stenosis of aorta (B) just below entrance of ductus arteriosus (C). A is placed upon the widened pulmonary artery. The specimen shows great dilatation of the arterial branches and arch of aorta above the stricture.

G.—*Anomalies in the auricular ventricular valves.* The remaining anomalies are chiefly those affecting the tricuspid and mitral valves, and these cases are so rare that it is difficult to make any general statements concerning them.

The representative of this group in the collection is so curious that it seems to deserve to be reported in some detail.

The case was that of an artist who had always been blue and who died at the age of 30 of pulmonary tuberculosis. At the autopsy there was found to be a chronic tuberculosis of the lungs, with chronic passive congestion of the viscera. The heart was enlarged, the enlargement being especially in the right side. The Eustachian valve is found to persist as a large apparently functional valve. The valvula foraminis ovalis also persists, but is not competent to close the foramen ovale, which is open to a width of about 1 cm. The very large appendix auriculæ opens by two mouths into the auricle, which is somewhat constricted near its middle by a muscular ring.

The figures of Plate IV have been arranged separately as they are designed for use in the stereoscope.



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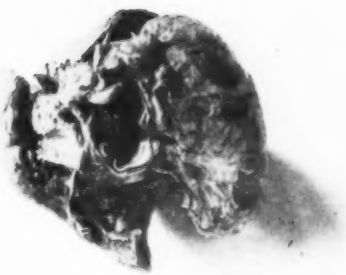

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THE JOHNS HOPKINS HOSPITAL BULLETIN, MARCH, 1900.

PLATE IV, Fig. 7.

THE JOHNS HOPKINS HOSPITAL BULLETIN, MARCH, 1900.

PLATE IV, Fig. 8.

The tricuspid valves are ballooned out into the right ventricle and have apparently become closely grown together with the ventricular wall. Two of the segments are visible against the interventricular septum and toward the left—these are wrinkled and folded membranes, which are very soon fused with the ventricular wall and are apparently functionless. The remaining segment seems to furnish the whole membrane which lines the ventricular wall and septum; and below, roofing the trabeculæ, forms the floor of a sort of intervalvular chamber. This chamber opens into the ventricle through a round opening, situated toward the left, just below the conus arteriosus and guarded by a flap-like fold of the chamber wall. It further opens through several small openings, each guarded by tiny valves which are furnished with chordæ tendineæ and papillary muscles. The pulmonary artery is slightly narrowed, and the ductus arteriosus persists as a cord, but otherwise the heart is approximately normal.

Ebstein * has reported a case in which the malformation of the heart coincides in every detail with this one, and although no other such cases are reported the recurrence of the malformation in every detail suggests in a way that cannot be ignored the existence as a cause of a definite sequence of events. A possible explanation is as follows: The valves are, of course, formed on the medial side by a prolongation from the septum intermedium—on the lateral side by an involution of the wall of the auricular canal. If in an early stage these endothelial cushions reach a greater extent than normal, and retain their attachment to the muscular trabeculæ, they would in time become a membrane, supported by muscular trabeculæ. This might occur only on the lateral side, the valves produced from the septum, developing in part normally. The free edge has possibly lost its muscular attachment as a result of the inefficiency of muscular action in the direction in which the blood stream affects it.

The association of pulmonary tuberculosis with this malformation (also observed in Ebstein's case) is interesting in connection with what was said above as to pulmonary stenosis. Naturally the effect of such an insufficiency of the tricuspid—for the mere presence of a large inner chamber, acted upon by the contraction of the ventricle, but not guarded from the auricle constitutes an insufficiency—is the same as that of the pulmonary stenosis in producing a poor nutrition of the lung tissue. The compensating persistence and development of the Eustachian valve is also to be noted.

FIGS. 7 and 8 illustrate this malformation. FIG. 7 shows the right auricle and ventricular portion of the heart laid open. The open foramen ovale (A), and the two mouths of the auricular appendix are readily seen; B points to the large round opening into the ventricle; C, the apical portion of the functional ventricle; D, the medial leaflets of the tricuspid valve.

In FIG. 8, the conus arteriosus pulmonalis is laid open, showing the larger portion of the functional right ventricular cavity with the opening B just below the pulmonary orifice and guarded by the flap-like valve.

In connection with several malformations, it may be stated that the theories as to their origin, ascribed them formerly either to a true congenital malformation, or to a fœtal endocarditis. The majority of authors, however, now lean to the view that the rôle of fœtal endocarditis is relatively unimportant, and that the vegetations so often seen on malformed valves, on the edges of septal defects, etc., are to be explained as the result of the predisposition of such malformed parts to inflammatory processes.

* Ebstein. Arch. f. Anat. and Phys.,'1866, S. 238.

SUMMARIES OR TITLES OF PAPERS BY MEMBERS OF THE HOSPTAL AND MEDICAL SCHOOL STAFF APPEARING ELSEWHERE THAN IN THE BULLETIN.

THOMAS R. BROWN, M. D. Internal Medicine.—*Maryland Medical Journal*, February, 1900.

ROBERT REULING, M. D. Pathology.—*Maryland Medical Journal*, February, 1900.

HUGH H. YOUNG, M. D. Surgery.—*Maryland Medical Journal*, February, 1900.

WILLIAM OSLER, M. D., and THOMAS MCCRAE, M. D. Latent Cancer of the Stomach.—*Philadelphia Medical Journal*, February, 1900.

HENRY J. BERKLEY, M. D. General Pathology of Mental Diseases.—*American Journal of Insanity*, January, 1900.

HENRY J. BERKLEY, M. D. Transitory Alienation Following Distressing Pain.—*American Journal of Insanity*, January, 1900.

WILLIAM OSLER, M. D. After Twenty-Five Years.—*Montreal Medical Journal*, November, 1899.

PATRICK CASSIDY, M. D. Report of a Severe X-Ray Injury. —*Medical Record*, February 3, 1900.

IRVING PHILLIPS LYON, M. D. The Inoculation of Malaria by the Mosquito.—*Medical Record*, February 17, 1900.

LEWELLYS F. BARKER, M. D., and JOSEPH MARSHALL FLINT. A Visit to the Plague District in India.—*The New York Medical Journal*, February 3, 1900.

THE JOHNS HOPKINS HOSPITAL BULLETIN.

The Hospital Bulletin contains details of hospital and dispensary practice, abstracts of papers read and other proceedings of the Medical Society of the Hospital reports of lectures, and other matters of general interest in connection with the work of the Hospital It is issued monthly.

Volume XI is now in progress. The subscription price is $1.00 per year. The set of ten volumes will be sold for $20.00.

PROCEEDINGS OF SOCIETIES.

THE JOHNS HOPKINS HOSPITAL MEDICAL SOCIETY.

Monday, February 5, 1900.

The meeting was called to order by the President, Dr. H. M. Thomas.

Exhibition of Patients.—Dr. W. B. Platt.

Case 1.—Infant, seven months old, came to the Garrett Hospital when five months of age with a sinus just below the right eye and a history that pus occasionally escaped from the right nostril. An examination showed an empyema in the right antrum with necrosis of the bony wall in at least two places. The sinus above had caused contraction of the lower eyelid. There is also an opening into the nose apparently one-eighth inch in diameter. I removed a molar tooth as the best way of getting a free opening into the antrum to clean it out. The child improved immediately, the sinus above healed up, and the discharge was not more than a drop a day, and the child was sent home. A small piece of necrosed bone was also removed from the alveolus.

The child returned in seven weeks with the history of a recurrence. Pus now escapes through the right nostril and from the sinus below the right eye. I do not find any record of cases similar to this in infants, and the exact cause is not clear. It may be an osteomyelitis. The probability is that there was an abnormally large opening from the antrum into the nose which became infected during child birth, with subsequent involvement of the delicate bone wall.

Case 2.—This boy, seven years old, has a curious defect, a hole ¼ inch in diameter in the palatoglossus muscle of the left side. There is every reason to believe that it is a congenital defect. Of course, one may suppose it a case of congenital or inherited syphilis, but in view of the frequent defects in the development of the soft palate, it is probably one of this kind.

Case 3.—This is a case of congenital hip-joint dislocation. The girl, six years old, was sent to the Garrett Hospital from Virginia, with the history that she had always limped, and became fatigued on prolonged exertion. An examination of the right limb will show you that it is not hip-joint disease. She has perfect mobility, not the slightest hampering of the movements of the limb and no bowing up of the lumbar region on flexion of the thigh on the pelvis. On first looking at it I thought of infantile paralysis, because the whole limb is somewhat atrophied in appearance as compared with the other. The distance from the right anterior superior spine to a horizontal line drawn through the right trochanter is three-quarters of an inch less than corresponding measurements on the left side. On drawing down the right thigh limb and letting it go we get a distinct, though slight, telescoping.

What is to be done with children of this sort? If the telescoping amounts to three or four inches, if the gait is very bad, or fatigue or pain follows moderate exertion, an operation must be done. Statistics show that after two or three years the hip in many cases again telescopes. A man of large experience has said that fifty per cent. of the operated cases relapse. This little girl walks and runs so well that we have tried only massage to increase the strength of the gluteal muscles. Some cases have done well by use of the Lorenz hip-joint apparatus to keep the hip extended and pressed into the socket for some months. A certain number of these cases never have anything more than a slight limp.

Changes in the Cells of the Nucleus Dorsalis resulting from Pressure upon the Lower Portion of the Spinal Cord.—Dr. Barker.

The specimen is from a case of compression of the upper part of the thoracic cord, the section being taken from the lower part of the thoracic portion. It will be recalled that the thoracic portion of the cord is characterized by the presence of a column, or nucleus, of gray matter on each side called Clarke's nucleus, or the nucleus dorsalis. The cells in this nucleus, give off axis-cylinder processes which run out into the dorsolateral region of the cord and then turn upward, ascending through the cord to the cerebellum, the whole bundle being known as the fasciculus spinocerebellaris dorsolateralis, or direct cerebellar tract. If one cuts through a medullated axone, there result changes in the whole neurone. If the axone of a neurone be cut anywhere between its cell-body of origin and the end of its axis-cylinder process, the nucleus becomes displaced in the cell-body, assuming an eccentric position, usually very close to the axone hillock; in addition to this change the tigroid masses, or Nissl bodies, break down into very minute granules, like fine dust, which become diffused through the cell. If the ulnar nerve, for example, be cut, one finds in the spinal cord that all the cells which give origin to the fibers of the ulnar nerve show this peculiar form of degeneration—so-called "reaction at a distance." If then the cells of Clarke's nucleus send their axones to the cerebellum, we should expect, in compression of the upper thoracic cord, to find this change below the lesion, in all the cell-bodies which send their axis-cylinder processes to a part of the cord above the lesion. Accordingly sections from this cord below the lesion ought to show degeneration of the cells of Clarke's nucleus. The specimen under the microscope illustrates the alterations well. The cells show the change described in varying degrees of intensity. I have before pointed out the occurrence of similar changes in the nucleus dorsalis in inflammations of the soft meninges (*Brit. M. J.*, Lond., 1897, ii, pp. 1839-1841). The superficial position of the fibers of the direct cerebellar tract makes it especially liable to injury.

Area of Necrosis in Internal Capsule in Typhoid Fever.—Dr. Barker.

It was not easy to make out the lesion when the brain was first cut up. The brain was put into formaline immediately after its removal and was divided by the method of Petri some days later. On cutting through the brain it was found that the formaline had not penetrated the whole substance of each hemisphere, there being a large area that was soft. No definite area of necrosis was made out. In view of the marked clinical symptoms it seemed necessary to keep the tissue of

the right side for microscopic examination. These pieces were put back into the formaline in order to complete the hardening.

The hardening has now become complete and the lesion is perfectly well-defined and easily visible. It is an area of softening in the upper part of the right internal capsule, about the size of a small hickory nut, situated just lateral from the caudate nucleus a little medial and slightly dorsal from the upper border of the cortex of the island of Reil.

The necrosis must have involved practically all of the fibers of the pyramidal tract on the right [illegible], and is undoubtedly due to a plugging of a branch of the artery supplying the area. The tissue is to be thoroughly worked up microscopically, but it seemed to be worth while before cutting the pieces into sections that the gross lesion should be presented to the Society.

Poisonous Snakes.—DR. KELLY.

Dr. Kelly concluded his demonstration of the poisonous snakes of North America by exhibiting: 2 specimens of Elaps fulvius, one of which had caused the death of a man by biting him in the hand; 1 boa constrictor (young) showing remarkable difference from native snakes in the fine bead-like appearance of the body due to the scales in 83 rows, and the peculiar pear-shaped head also covered with minute scales; 1 Sistrurus miliarius, or ground rattlesnake; 2 large diamond-back rattlesnakes; 1 living moccasin, Trigonocephalus piscivorus; 1 mountain blacksnake, Bascanium constrictor; and casts of snakes made by Mr. John W. Thompson, of the Philadelphia Zoological Gardens, one finely colored Texas copperhead, one very large diamond-back rattlesnake, and one very large moccasin.

NOTES ON NEW BOOKS.

An Experimental Research into Surgical Shock. By GEORGE W. CRILE, A. M., M. D., Ph. D. 8vo. pp. 160. (*Philadelphia: J. B. Lippincott Company*, 1898.)

Due mainly to the leadership of the German and French schools of pathology, the research work of most surgical laboratories in this country to-day is devoted largely to the investigation of problems which the comparatively modern subjects of pathological histology and bacteriology have offered for solution. In consequence it has gradually come about that the methods of investigation best known to the physiologist have fallen into abeyance in spite of the valuable data relative to surgical principles which may be obtained by their employment. Prompted by some preliminary research conducted in the laboratory of his quondam preceptor, Mr. Victor Horsley, Dr. Crile, making use of physiological methods of experimentation, has undertaken an investigation concerning the nature of surgical shock; a subject which has always been somewhat nebular in its indefiniteness and offering problems the solution of which can only be approached by employing these methods.

The results of this excellent piece of work are comprised in a small volume of 160 pages which received the Cartwright Prize in 1897.

The essay represents the results of entirely personal observations, and in this lies, perhaps, the chief occasion for congratulation; and yet, on the other hand, for criticism of the author's published work, the value of which, considerable as it now stands, would have been greatly enhanced as a book of reference had the bibliography of the subject been given, and the comparative results of other investigators in the same direction been cited. A cursory review of the theories of shock advanced by various writers is contained on the introductory four or five pages of the volume without references to the articles which have evidently been consulted.

After a brief description of the "Modes of investigation and annotation" which, though original with the author, are those commonly employed in the physiological laboratory, the chief part of the essay (100 pages) is given up to the detail of the individual protocols of the 148 experiments upon anæsthetized dogs.

In these experiments, observations were made of the effects upon the respiratory, cardiac and vascular mechanism of all conceivable forms of traumatism upon the individual tissues and organs of the body, somatic, splanchnic and neural. These experiments evidence the author's thoroughness and ingenuity, and though their record, from necessary repetition, makes the protocols uninteresting reading, an excellent index renders it possible to abstract data from them, otherwise buried in the mass of material, which will be of value to those pursuing similar lines of investigation.

The author has given an interesting summary of his experimental findings in the latter part of the volume, with 35 composite charts of manometric readings, illustrating the effects produced upon the blood pressure by the various experiments. These included procedures showing the rise in blood pressure consequent upon burning the skin, injuries of the periosteum, dilatation of the sphincter ani, etc.; procedures showing the negative effect of certain manipulations, as upon the joints: procedures showing the great "depressor" effect of cutting away the cerebral hemispheres, of manipulation of the larynx, the testicle, the parietal peritoneum, the intestines, etc. It was furthermore demonstrated that when an animal was exhausted, as late in an experiment, and with shock present or pending, the application of stimuli, ordinarily producing a temporary rise in blood pressure, under these circumstances would be followed by a fall.

Possibly, from a practical standpoint, the most valuable suggestions from Dr. Crile's work originate in the results of his observations upon the "blocking" effect of the preliminary local administration of cocaine as a preventive measure toward shock in anticipation of those peripheral manipulations which ordinarily have a marked depressor effect. This is most strikingly shown in one of the composite charts (near page 127. These charts unfortunately are not numbered) which illustrates the great fall in blood pressure which ordinarily follows upon manipulations of the larynx, and the inhibitory effect of preliminary cocainization of the mucosa upon this fall.

As prophylactic measures toward shock the author emphasizes the necessity of careful hæmostasis under all circumstances; of atropine in operations on the larynx or in procedures which might cause mechanical stimulation of the vagi; of a proper respect for tissues and the avoidance of tearing or finger dissections unfortunately used by many operators. Precautions toward over anæsthetization, especially with chloroform, are dwelt upon as most likely to occur in those operative procedures which are associated with an acceleration of the respiratory rate, and in abdominal, anal and other operations. Emphasis is also laid upon the likelihood of shock, in consequence of operations in the gall-bladder or pyloric region, due to pressure on the venous trunks, diaphragm and splanchnic nerves. He truly says, "The severity of shock produced in abdominal operations is in direct ratio to the distance from the pelvis."

Dr. Crile offers nothing new in the matter of treatment, believing that small and frequently repeated hypodermic injections of strychnia and intravenous saline infusions to be the most efficacious measures, with elevation of the lower extremities, application of heat, etc. Emphasis is rightly given to the fact that intelligent prevention is more valuable than treatment.

In the etiological factors producing shock the author does not seem in his views to differ widely from the theories proposed by Fischer, Goltz and Seabrook. An attempt is made to differentiate *collapse* and *shock*, the latter being regarded as especially dependent upon "vasomotor impairment or break down," the degree of shock being proportionate to the failure of the pressor action. Factors, cardiac, respiratory and hemorrhagic, may add to shock, or, if their effects are severe and immediate, may produce collapse. Certain widespread vasomotor action, as that following section of the splanchnic nerves, may, however, produce the same condition.

Dr. Crile's work is important in the effect it will have in stimulating investigation of surgical problems on physiological lines. It is to be hoped that observations by the methods of Nissl will be made upon the histological changes in the medullary nerve centers and ganglia responsible for these vasomotor disturbances, and also that mercurial manometers, constructed so as to be applied to the extremities, may be employed in surgical operating-rooms for the purpose of recording vasomotor effects and changes in blood pressure, and to indicate impending shock more definitely than at present is possible through the medium of the anæsthetizer's finger on a peripheral artery. CUSHING.

Essentials of Diseases of the Skin, including the Syphilodermata, arranged in the form of Questions and Answers prepared especially for Students of Medicine. By HENRY W. STELWAGON, M. D., Ph.D., Clinical Professor of Dermatology in the Jefferson Medical College, etc. Fourth Edition, thoroughly revised. Illustrated. (*Philadelphia: W. B. Saunders*, 1899.)

In the present edition, the whole book has been subjected to careful scrutiny and revision, and the text has undergone numerous small but important changes in order that it may reflect the present state of knowledge of cutaneous diseases. The rarer affections like hydroa vacciniforme, blastomycetic dermatitis, and erythema induratum are briefly but adequately described. The book is extremely useful to students of medicine who wish to review the subject.

A Text-Book of Embryology for Students of Medicine. By J. C. HEISLER, M. D. (*Philadelphia: W. B. Saunders*, 1899.)

The work thus presented to us is an attempt to supply the real need of a concise text-book of embryology, written in the English language, and planned especially for the average medical student who is learning anatomy.

A few words will characterize the book. It is not a new account, but a condensed familiar one. It is a fairly straightforward statement of human development, such as one might write who was acquainted with anatomy, and who wrote the embryological story from a reliable knowledge of four or five well-known text-books; as, for instance, Mark's translation of Hertwig's work (the influence of which is very strongly manifest); the American text-book of obstetrics; Minot's embryology; Piersol's histology, etc.

The press-work is good, and large-type headings are convenient for reference. Comparative references and discussions are eliminated wherever possible; making it easy to quickly find the main facts of development as here given for any special structure.

The weakest portion of the book is that devoted to the earlier phenomena: fertilization, the ovum, maturation, the sperm, cleavage, germ-layers, fœtal appendages, etc.

On reading these pages (and the same is true of other sections), we wonder how the writer of a text-book to-day can be satisfied with such an antiquated and incomplete résumé. Certainly, there has been no lack of remarkable discoveries and well-founded generalizations by the embryologists and cytologists of the last ten years, from which to formulate a modern and comprehensive statement, however brief.

In all fairness to the science it attempts to treat, a good text-book should be at least up to date, representing the most recent advances in all lines of investigation. The book before us would be greatly improved by the incorporation of what is found to be valuable, after a judicial sifting of the original contributions of recent embryological research.

We must not, however, be too severe on those who seek to adapt the good work of others to a special need—a difficult task. Even if the result be little more than a fairly clear restatement of the conceptions of two or three master minds, who have already brought together the main threads of research, those who may be introduced to the subject in this indirect manner, will, at any rate, receive many valuable and reliable facts. H. Mc. E. K.

Essentials of Anatomy, including the Anatomy of the Viscera, arranged in the form of Questions and Answers prepared especially for Students of Medicine. By CHARLES B. NANCREDE, M. D., Professor of Surgery, etc., in the University of Michigan. Sixth Edition, thoroughly revised by FRED. J. BROCKWAY, M. D., Asst. Demonstrator of Anatomy, Columbia University, New York. (*Philadelphia: W. B. Saunders*, 1899.)

This is a thoroughly revised sixth edition of a useful little book which has been approved by long service in medical schools and training schools for nurses. It is concise without the sacrifice of clearness, and the excellent illustrations assist the text.

The Hygiene of Transmissible Diseases; their Causation, modes of Dissemination and methods of Prevention. By A. C. ABBOTT, M. D., Professor of Hygiene and Bacteriology, and Director of the Laboratory of Hygiene, University of Pennsylvania. Illustrated. (*Philadelphia: W. B. Saunders*, 1899.)

As the title indicates, this volume of 300 pages gives an account of transmissible diseases with details, more or less complete, as to their proper and successful management. The section on the causation of disease is probably the most satisfactory and philosophical of the whole book. It treats of the influence of age, sex, race, occupation, density of population, heredity and season, upon diseases in general; and also of chemical, physical, mechanical, parasitic and bacterial agencies as exciting causes of the actual development of diseases. This section is well illustrated by tables, charts and diagrams. The following section, on the causation, modes of dissemination and prevention of special diseases, contains much information as to diseases which are transmitted from one person to another. The account which is here given of the bacteriology of transmissible diseases is full and extremely satisfactory, as would naturally be expected from so accomplished and skillful an observer. The sections on prophylaxis and disinfection are also valuable, and the directions which they contain are sensible and practical. The book is well calculated to meet a want which has long been felt by physicians and nurses.

The Bulletin of the Ohio Hospital for Epileptics, Vol. I, Nos. 2 and 3. Gallipolis, O. The Hospital, 1898.

The volume consists of a number of papers by Dr. A. P. Ohlmacher, with an introductory statistical report by H. C. Rutter, manager of the hospital. The first two of Dr. Ohlmacher's papers form an account of the autopsies in cases of epilepsy performed during his service, which he prefaces with a somewhat detailed description of a rather ordinary autopsy technique. In these cases, special attention has been directed to the association of the lymphatic constitution with epilepsy, and throughout the report the effort is made to show that "idiopathic" epilepsy may perhaps be the direct result of the presence of the "constitutia lymphatica." It is sometimes difficult to follow the chain of arguments which connects the lymphatic constitution with epilepsy, rhachitis, tetany and exophthalmic goitre on the one hand and with the causation of gliomata on the other.

Two other papers are concerned with the description of various tumors of the central nervous system, with secondary epileptic symptoms. It is to be regretted that amid the profusion of illustrations there are no drawings of the microscopical appearances of the tumors to supplement the descriptions. In the fifth paper, there is described the case of an idiot child with immense thickening of the skin and subcutaneous tissues in association with atrophy of the thyroid, and another case in which there was a localized area of thickening of the skin without thyroid atrophy. Finally, the last paper is devoted to the description of tumors occurring in various animals.

The report is marked by a diffuseness which seems unfortunately common in neurological literature, but the suggestions contained are very worthy of confirmatory work. It seems especially desirable, too, that such work on comparative pathology as is embodied in the last paper should be more extensively carried out.

A Manual of the Practice of Medicine. By A. A. STEVENS, M. D., of Philadelphia. (*Philadelphia: W. B. Saunders*, 1900.)

This is the fifth edition of this work, which shows its popularity. Any extended notice regarding the book is unnecessary. Dr. Stevens has succeeded in condensing much into 500 small pages. The material chosen, and the method of its arrangement, make it one of the best books of its kind.

The American Year-Book of Medicine and Surgery, edited by GEORGE M. GOULD, M. D. Medicine. (*Philadelphia: W. B. Saunders*, 1900.)

The current volume of the Year-Book is a welcome addition to the library shelves. In these days, unaided by the *Index Medicus*, the gleaning of the fields of literature has become a heavy and often well-nigh impossible task. In this the series of volumes of the Year-Book is of valuable help. The work is too well-known to require any description of its characteristics. This year sees a new departure in the division of the work into two volumes, which will be found most convenient. In one volume it was growing beyond the bounds of easy handling. Dr. Gould, in the preface to the volume on Medicine, notes some changes in the editorial staff. Dr. Riesman takes charge of the section on Pathology in place of Dr. Guitéras. Drs. Wilcox and Stevens edit the department of Materia Medica and Therapeutics, while Dr. Abel is succeeded in Physiologic Chemistry by Drs. Hunt and Jones of Baltimore. The present volume sustains the previous high character of the work. Not the least useful feature is the complete index. We hope the work is having the pecuniary recognition that it deserves.

Letter, Word and Mind-Blindness. By JAMES HINSHELWOOD, M. D., of Glasgow. (*London: H. K. Lewis*, 1900.)

These are lectures delivered before the Glasgow Medico-Chirurgical Society which appeared in the *Lancet* and are now published in a book of 85 pages. The writer takes up the general subject of visual memory and then discusses the various groups of cases designated in the title. He is able to report several cases of his own, which were unaccompanied by derangements of the auditory and speech-motor centers. From the study of his cases and those in the literature, the writer considers that there are separate cerebral areas for the usual memory of numbers, letters and words. The lectures are well and clearly written, and the study of the cases given throws light on an exceedingly interesting subject. Dr. Hinshelwood shows how much may be made out of a few cases by thorough analysis.

BOOKS RECEIVED.

Archives of Neurology and Psychopathology. Vol. II. Nos. 1-2. 1899. 8vo. 319 pages. State-Hospitals Press, Utica, N. Y.

Transactions of the Clinical Society of London. Volume the thirty-second. 1899. 8vo. LVII + 296 pages. Longmans, Green & Co., London.

Transactions of the Texas State Medical Association. Thirty-first annual session held at San Antonio, Texas, April 25-28, 1899. 8vo. 347 pages. Von Boeckman, Schutze & Company, Printers, Austin, Texas.

A Manual of Modern Surgery, General and Operative. By John Chalmers Da Costa, M. D. Second edition. With 386 illustrations. 1898. 8vo. 911 pages. W. B. Saunders, Philadelphia.

A Text-Book of Materia Medica, Therapeutics and Pharmacology. By George Frank Butler, Ph. G., M. D. Third edition, thoroughly revised. 1899. 8vo. 874 pages. W. B. Saunders, Philadelphia.

A Text-Book of the Practice of Medicine. By James M. Anders, M. D., Ph. D., LL. D. Third edition, revised. Illustrated. 1899. 8vo. 1292 pages. W. B. Saunders, Philadelphia.

A Manual of the Diagnosis and Treatment of the Diseases of the Eye. By Edward Jackson, A. M., M. D. With 178 illustrations and 2 colored plates. 1900. 12mo. 604 pages. W. B. Saunders, Philadelphia.

A Manual of the Practice of Medicine. Prepared especially for students. By A. A. Stevens, A. M., M. D. Fifth edition, revised and enlarged. Illustrated. 1898. 12mo. XV + 519 pages. W. B. Saunders, Philadelphia.

A Text-Book of Diseases of Women. By Charles B. Penrose, M. D., Ph. D. Third edition, revised. Illustrated. 1900. 8vo. 531 pages. W. B. Saunders, Philadelphia.

Hints on Elementary Physiology. By Florence A. Haig-Brown. With twenty-one illustrations. 16mo. 1897. XII + 121 pages. P. Blakiston, Son & Co., Philadelphia.

The Medical Annual Synoptical Index to Remedies and Diseases. For the twelve years, 1887 to 1898. 12mo. 411 pages. [1899.] John Wright & Co., Bristol. Simpkin, Marshall, Hamilton, Kent & Co., Ltd., London.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by Hobart Amory Hare, M. D. Volumes I, II, III, IV. March, June, September, December, 1899. 8vo. Lea Brothers & Co. Philadelphia and New York.

A System of Medicine. By Many Writers. Edited by Thomas Clifford Allbutt, M. A., M. D., LL. D., F. R. C. P., F. R. S., F. L. S., F. S. A. Volumes VI, VII, VIII. 1899. 8vo. The MacMillan Company, New York.

Transactions of the American Ophthalmological Society. Thirty-fifth annual meeting, New London, Conn. 1899. 8vo. 469-592 pages. Published by the Society, Hartford.

Saint Bartholomew's Hospital Reports. Edited by Norman Moore, M. D., and D'Arcy Power, F. R. C. S. Vol. 35. 1900. 8vo. 356 and 246 pages. Smith, Elder & Co., London.

Transactions of the Louisiana State Medical Society. Twentieth annual session held at New Orleans, La., May 16, 17, 18, 1899. 8vo. 173 pages. New Orleans.

Practice of Medicine. A manual for students and practitioners. (Lea's Series of Pocket Text-Books) by George E. Malsbary, M. D. Series edited by Bern B. Gallaudet, M. D. Illustrated with forty-five engravings. 1899. 12mo. 404 pages. Lea Brothers & Co., Philadelphia and New York.

The American Year-book of Medicine and Surgery. Collected and arranged with critical editorial comments by S. W. Abbott, M. D., Archibald Church, M. D., *et al.* Under the general editorial charge of George M. Gould, M. D. Two Vols. 1900. 8vo. W. B. Saunders, Philadelphia.

Annual and Analytical Cyclopædia of Practical Medicine. By Charles E. de M. Sajous, M. D., and one hundred associate editors, assisted by corresponding editors, collaborators and correspondents. Volume IV. 1899. 4to. 622 pages. The F. A. Davis Co., Philadelphia, New York, Chicago.

Proceedings of the New York Pathological Society. For the years 1897 and 1898. 8vo. XVIII + 289 pages. 1899. Printed for the Society.

Seventh Report of the State Veterinarian of Maryland. December 1, 1899. 8vo. 249 pages. Baltimore.

Essentials of Anatomy, including Anatomy of the Viscera. Arranged in the form of questions and answers. Prepared especially for students of medicine. (Saunders' Question-Compends, No. 3.) By Charles B. Nancrede, M. D. Sixth edition, thoroughly revised by Fred. J. Brockway, M. D. 1899. 12mo. 419 pages. W. B. Saunders, Philadelphia.

Essentials of Medical Chemistry, Organic and Inorganic. Containing also questions of medical physics, chemical philosophy, analytical processes, toxicology, etc. Prepared especially for students of medicine. (Saunders' Question-Compends, No. 4.) By Lawrence Wolff, M. D. Fifth edition, thoroughly revised by Smith Ely Jelliffe, M. D., Ph. D. 1899. 12mo. 222 pages. W. B. Saunders, Philadelphia.

Essentials of Diseases of the Skin, including the Syphilodermata. Arranged in the form of questions and answers. Prepared especially for students of medicine. (Saunders' Question-Compends, No. 11.) By Henry W. Stelwagon, M. D., Ph. D. Fourth edition, thoroughly revised. Illustrated. 1896. 12mo. 276 pages. W. B. Saunders, Philadelphia.

MONOGRAPHS.

The following papers are reprinted from Vols. I, IV, V, VI and VIII of the Reports, for those who desire to purchase in this form:

STUDIES IN DERMATOLOGY. By T. C. Gilchrist, M. D., and Emmet Rixford, M. D. 1 volume of 164 pages and 41 full-page plates. Price, bound in paper, $3.00.

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